APRIL, 1954 Vol. 43, No. 4

Industrial Arts and Vocational Education

1914 40th Anniversary Year 1954

THE SHOP TEACHERS' PROFESSIONAL MAGAZINE

Marvelous are the things done . . .

Emerging from dubious antecedents, hypnotism is beginning to be recognized for what it can genuinely do . . . and for what it genuinely is. Hypnotism is merely suggestion according to most psychologists, and the marvelous feats performed during the "spell" simply dramatize the great power possessed by suggestion. But these exploits do not begin to tell of the extent to which suggestion is present in everyday life, or the extent to which men respond and are shaped by it.

In hypnotism, the subject agrees in advance to accept the preliminary suggestions of the hypnotist — and in so doing permits the operator later on to establish and control the content of the subject's mind.

The same thing happens when a person goes to a movie: he agrees in advance to accept what the movie announces, and as the picture unfolds, it establishes and controls the content of the person's mind.

And, in fact, when a boy comes to school he too is agreeing in advance to accept the educator's approach. Not that the educator strives to establish and control the content of the lad's mind but by subtle suggestion and impression he seeks to lead the youngster to the point where the *boy* establishes and controls the content of *his* mind. And when this is done right, there need be no further worry about the future outcome.

But just as hypnotist and movie maker are consistent so that no seeming contradiction breaks the *rapport*, so by consistent respect for his subject, for its outcome, for the students in his care, for the work they do, the educator must reinforce the hold he has on the youngster's enthusiasm, zeal, imagination and belief.

No instructor in mechanical drafting will risk vitiating all he has taught and all he will teach, by saying it does not matter whether the student work with cheap and childish drafting instruments. Rather, he insists upon full, honorable quality, full craftsmanship, worthy of the ends of the work and the great careers to which it can lead. This is the climax and *denouement* of *that story*. Nothing must prevent its being told to the end.

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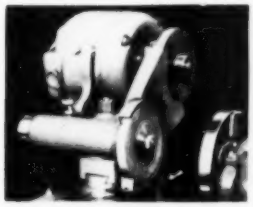
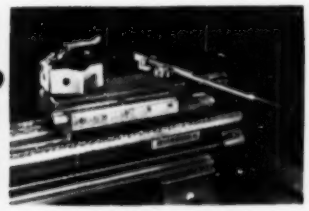

External Grinder

Milling Attachment

Handlever Tailstock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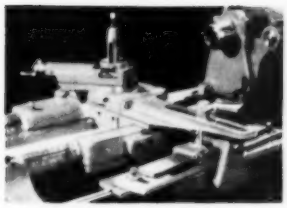
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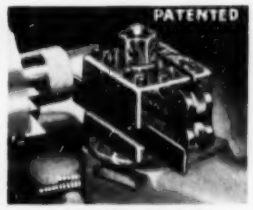
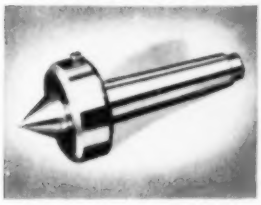
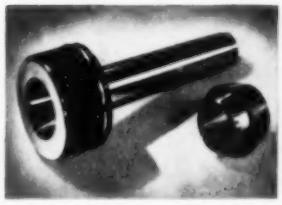
Handwheel Collet Attachment

Handlever Collet Attachment



10 in 1 Tool Holder


Ball Bearing Live Center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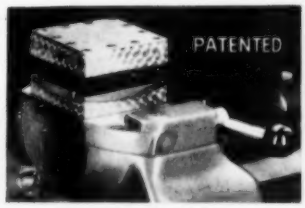
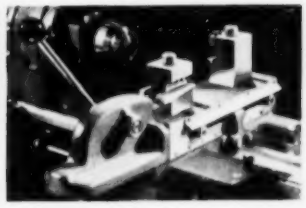


Square Turret Tool Block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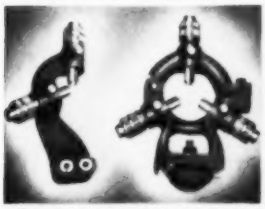
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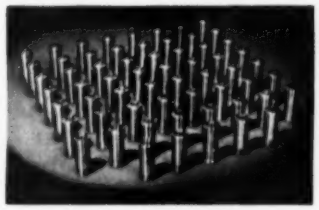
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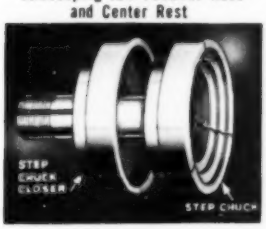

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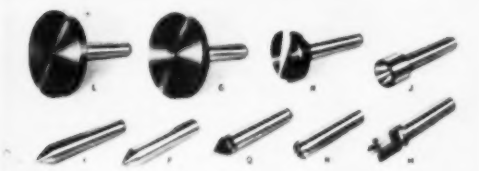
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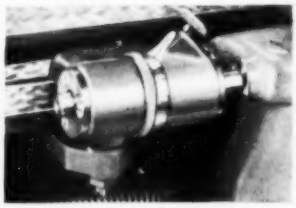
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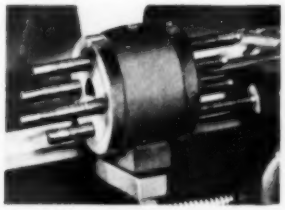
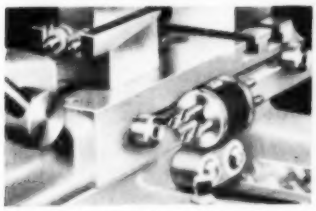

Four Position Carriage Stop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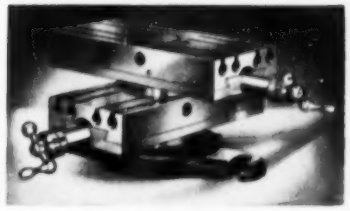
Safety and Standard Lathe Dogs

Coolant Pump


Universal Table

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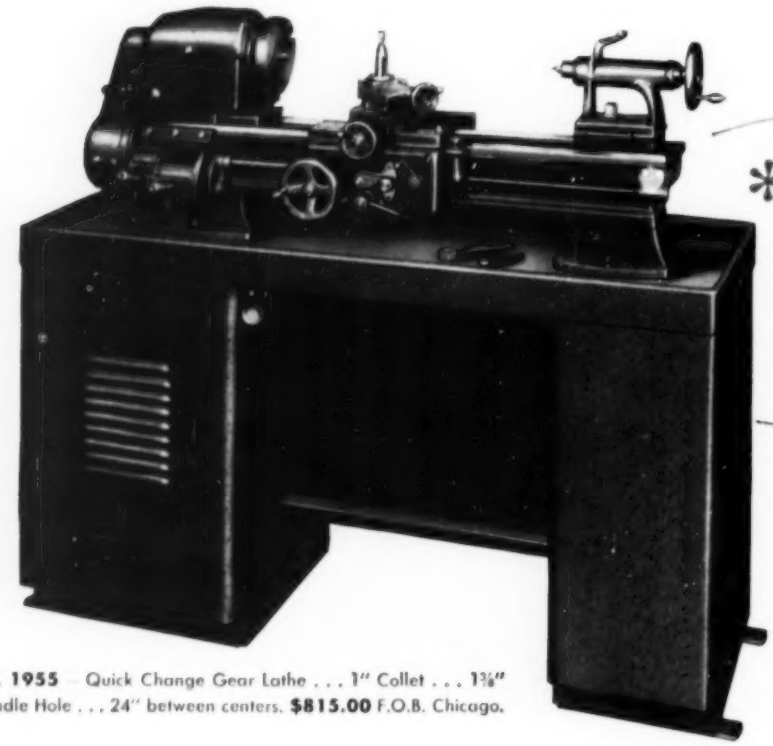

*One of the many in the complete Logan Line of 9", 10", 11" and 12" swing Lathes, and 8" Shapers.

No. 1955 — Quick Change Gear Lathe . . . 1" Collet . . . 1⅜" Spindle Hole . . . 24" between centers. **$815.00** F.O.B. Chicago.

Student interest in shop work is sharply stimulated by the wide range of challenging projects this 11" lathe permits. With its 1" collet capacity, 1⅜" spindle hole and 24" centers, the "1955" turns work of substantial size. Furthermore, it enables your students to learn on one of American industry's standard modern lathes.

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Brief Facts

Collet Capacity, 1"

Spindle Hole, 1⅜"

Swing over bed, 11⅛"

Center Distance, 24"

Bed Width, 6 15/16"

Ball Bearing Spindle

16 Spindle Speeds, 45 to 1500 rpm

Double V-belt Drive for extra power to spindle is completely enclosed

Threads—48 selections, RH or LH—4 to 224 per inch

Write for the Logan Lathe Catalog

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APRIL
1954

VOL. 43 NO. 4

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

The Shop Teachers' Professional Magazine

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This Month's Cover

The cover picture selected for the April, 1954, issue of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION portrays a class in practical chemistry under the direction of Benjamin J. Novak, instructor, Frankford High School, Philadelphia, Pa.

Photograph by David Lovas, student photographer.

• • • • •

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Personal News

JOHN A. McCARTHY TAKES VOCATIONAL EDUCATION POST ON FORMOSA

John A. McCarthy, assistant state commissioner of education of New Jersey, resigned to become chief of the Pennsylvania State College staff on Formosa. He will assume his new duties on April 15, 1954.

These duties will consist of co-ordinating the activities of the staff and teachers of vocational industrial secondary schools on the island.

He will be stationed at the Taiwan Teachers College.

Mr. McCarthy has been a member of the Vocational Division of the New Jersey Department of Education since 1919.

He began his career in vocational education as teacher and supervisor in the New York City Schools. Then he was made director of the apprentice and adult school of the Singer Manufacturing Company. He also was appointed state director of the New Jersey National Youth Administration for one year.

During World War II he was director of war production training, and later was made state director of apprentice and on-the-job training program for veterans.

He has been very active in professional educational organizations. He holds membership in the National Education Association, the American Association of School Administrators, American Vocational Association, New Jersey Educational Association, New Jersey Vocational and Arts Association, New Jersey Council on Education, Epsilon Pi Tau, and the Iota Lambda Sigma fraternities.

He has been president of the National Association of State Directors of Vocational Education, and the American Vocational Association. He also has served as a member of the advisory committee to the U. S. Commissioner of Education on vocational education problems.

He is the author of two vocational education textbooks, and has done considerable writing for the professional magazines in the fields of industrial arts and vocational education.

PHILIP L. McNAMEE TRANSFERRED TO WEST COAST

Philip L. McNamee, who was an assistant superintendent of the Department of Vocational Education at Chicago, Ill., up to his retirement on January 28, 1949, and who has since then acted

Philip L. McNamee

as director of educational research for the American School at Chicago, Ill., has now been transferred, in the same capacity, to California.

He will work there with C. G. Johnson, manager of the West Coast Hollywood office of the American School, and contact educational and industrial leaders regarding apprenticeship and other areas of training by the home study method.

DR. CHARLES H. SECHREST TO TEACH SUMMER SESSION AT STATE COLLEGE, PULLMAN, WASH.

Dr. Charles H. Sechrest will teach in the Department of Industrial Arts at Washington State College, Pullman, Wash., this coming summer session. Dr. Sechrest is well known for leadership and service in the field of industrial education. He is coauthor of the textbook, *Materials of Construction*, with Dr. Verne C. Fryklund, president of The Stout Institute. Sechrest is also coauthor of three bulletins published by the Detroit board of education and has contributed several articles to magazines devoted to industrial education. An abstract of his dissertation, the title of which is *Supervision of Industrial Arts; Effective Practices for Selected Major Problems*, will soon be ready for publication. Sechrest received his doctor of education degree from Wayne University, Detroit, June, 1953.

Dr. Sechrest has served most of his teaching career in the public schools of Detroit and Wayne University. In addition to his regular teaching assignment as an industrial-arts teacher in the public schools, he serves as a member of the Co-operating Faculty of Wayne University both as a critic teacher and as a special instructor

(Continued on page 6A)

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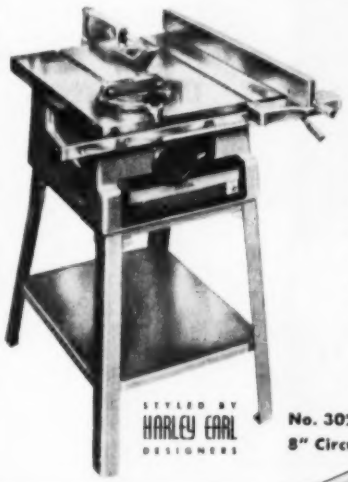
If your plans include a new or enlarged shop, or replacement of present machines, by all means study the outstanding features of ATLAS units. Compare the rugged, durable construction, the ease and accuracy of operation, and the many exclusive features. Then compare ATLAS prices . . . make any comparison you wish . . . a thorough study will make ATLAS your first choice.



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PERSONAL NEWS

(Continued from page 4A)

in the late afternoon and evening program at Wayne. Courses that he has taught at Wayne include "Materials of Construction," "Modern Industrial Processes," "Curriculum Planning," "Teaching Aids and Devices," "Organization of the General Shop," and "Essay and Thesis Direction." During the second semester, 1953–54 Dr. Sechrest will be traveling to London, Ontario, to offer a course in "Problems in Industrial Teaching" for the industrial-arts teachers of that province.

Sechrest is a member of Phi Delta Kappa, Mu Sigma Pi, and a laureate member of Epsilon Pi Tau. Other organizations of which he is a member are American Vocational Association, American Industrial Arts Association, Michigan Industrial Education Society, and Michigan Education Association.

Dr. Charles Sechrest

After the close of the summer session at State College, Dr. Sechrest, Mrs. Sechrest, and their two daughters plan to travel extensively through the West before returning to their home in Dearborn, Mich.

♦ C. M. Miller was honored at a dinner marking his retirement as director of vocational education in Kansas for the past 31 years. The dinner was given Sunday evening, January 17, 1954. More than 150 friends of Mr. Miller from all parts of the state attended.

Horace Rich, Coldwater, chairman of the Kansas State Board, acted as toastmaster. G. F. Liebendorfer, director, State Board for Vocational Education in Nebraska, and J. C. Woodin, assistant superintendent of schools in Wichita, were the main speakers.

Mr. and Mrs. Miller were presented with a 21-inch console TV set. Presentations were also made by the Kansas Association of Future Homemakers of America, Future Farmers of America, and the Business Education Clubs of Kansas.

Mr. Miller asked, and was granted, the privilege of presenting and introducing his successor. In presenting Mr. Arnold, Mr. Miller urged his coworkers to "carry on" with his successor, as they had with him.

♦ George F. Henry, head of the industrial-arts department of Colorado A. & M. College, Fort Collins, Colo., has received the degree of doctor of education from the University of Florida.

The title of his dissertation was "Techniques for Selection and Guidance of Graduate Students in Industrial Arts Education."

Mr. Henry has returned to resume work at the college after finishing his study for the advanced degree.

♦ Lawrence Borosage, who resigned as Chief of the Trade and Industrial Education Branch of the Office of Education, Washington, D. C., has assumed his new responsibilities as assistant in the Teacher Training Division, Michigan State College, East Lansing, Mich.

♦ Nathan B. Giles, who has been a member of the Trade and Industrial Education Branch of the Office of Education, Washington, D. C., for many years, will in his capacity as assistant chief be responsible for the work of that Branch until further notice.

♦ Charles G. Krokstrom, Elsmore, Kans., a member of the State Board of Education for several years, died on January 10, 1954. Memorial services were conducted at the Friends Home Lutheran Church, Savonburg. We all mourn the loss of Mr. Krokstrom; his sound ideas on education of all kinds will serve as a monument to him for many years.

♦ John H. Erickson received the doctor of education degree in industrial-arts education at the summer commencement of the Pennsylvania State College on August 8, 1953. The title of his dissertation was "Recommended Equipment Requirements for Comprehensive General Shops Based on Certain Industrial Arts Activities and Objectives for the Junior High School."

Dr. Erickson is associate professor of industrial arts at Georgia Teachers College where he has served as a teacher educator since 1946. He received the B.S. and M.Ed. degrees at the University of Missouri.

♦ Warren Messman, who has been teaching at Aberdeen, S. Dak., for the past six years, has joined the staff of the Nebraska State Teachers College, Kearney, Neb.

He is replacing Otto Means, who has resigned his position at Nebraska State Teachers College to enter the insurance business at North Platte, Neb.

♦ Archie E. Thomas, teacher of industrial arts at the high school in Yoncalla, Ore., died in the Cottage Grove, Ore., hospital on December 24, following a heart attack.

(Continued on page 16A)

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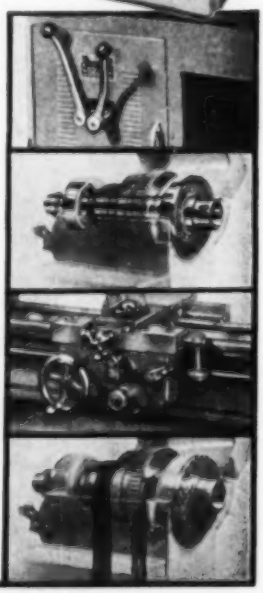

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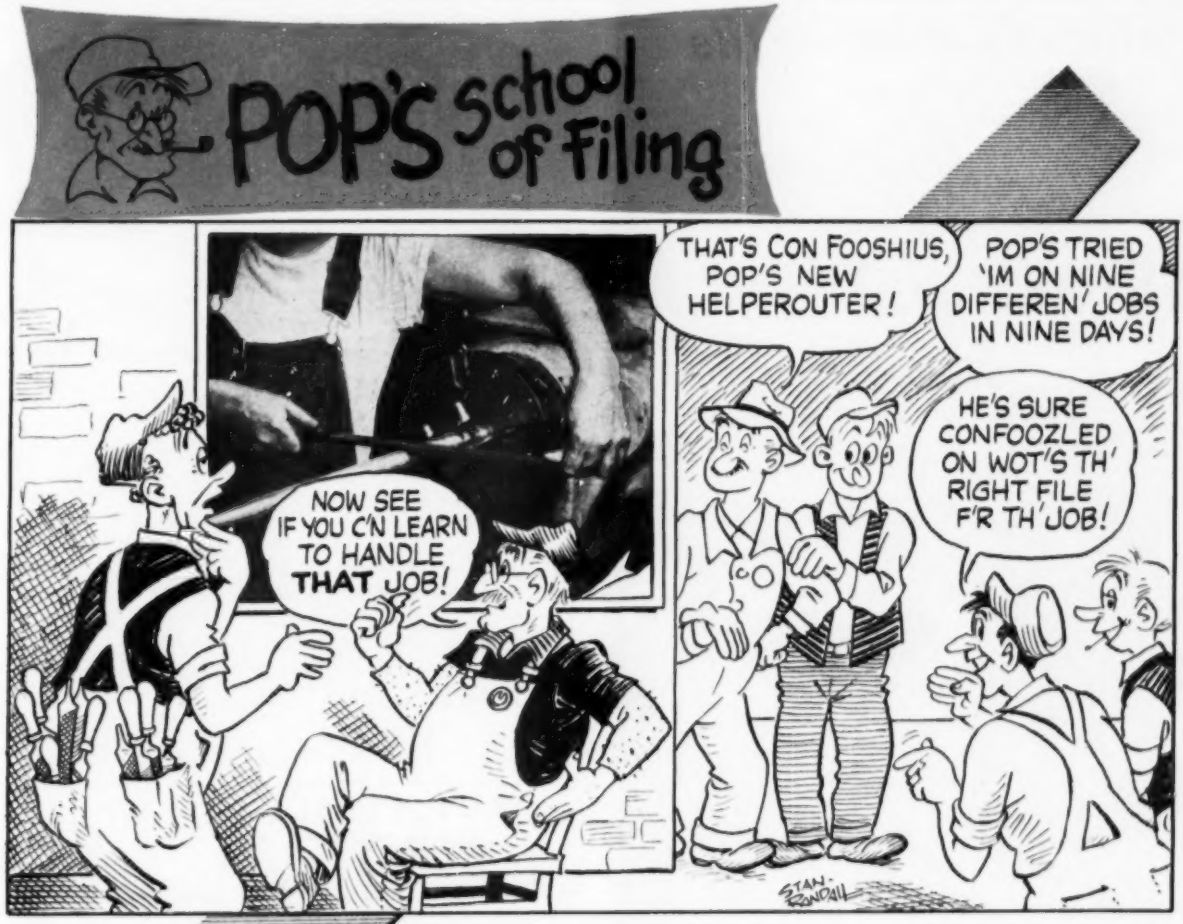
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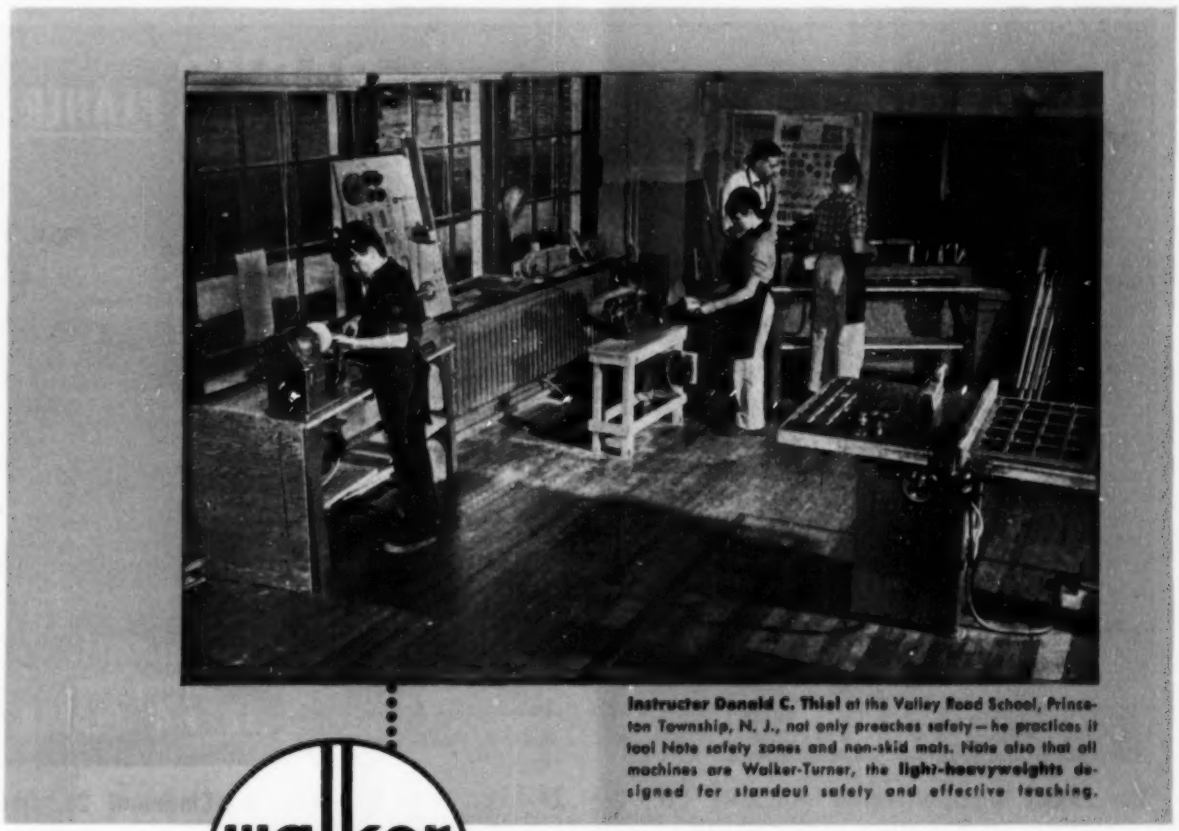

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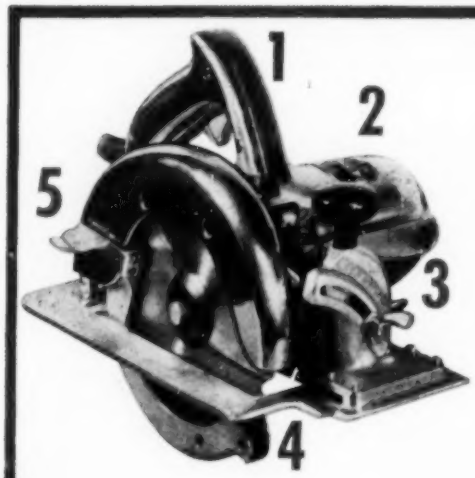

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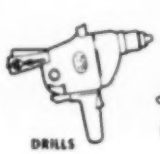
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INDUSTRIAL ARTS and VOCATIONAL EDUCATION
The Shop Teachers' Professional Magazine

APRIL 1954

Effective Training of Industrial-Arts Teachers

CHRIS H. GRONEMAN
Industrial Education Department
The A. & M. College of Texas
College Station, Tex.

The problem of training industrial-arts teachers has confronted teacher training personnel as long as there have been training programs established. There are many effective methods and programs; however, most of them depend upon the effectiveness of the teaching personnel at the institution where teachers are prepared. In order to give this problem further consideration, it is necessary to study various aspects which affect training.

Present Status of Teacher Shortage

The present status of the industrial teacher shortage is creating a dilemma that will affect the rank and file of the entire teaching profession. The situation is becoming so acute that practically all organization groups from the nonteacher population are demanding that some favorable consideration be given to salaries. While teacher salaries have been increased to some extent, it will require further increases to induce teachers to return to their former positions and to attract outstanding graduates of high schools and students in college to train as teachers.

This situation is creating many stories and jokes which may be heard over the air waves by newscasters and comedians concerning the underpaid profession which we belong to. The Gallup Poll and other nationally known bureaus have made popular inquiries to determine the public reaction and general sentiment concerning this issue. The voters have indicated, an extremely favorable response toward the increase of salaries to attract the better qualified people to the profession. This is not a temporary problem, but one which vitally affects the future education of our youth.

Curricula for Industrial-Arts Teachers Training

In view of the shortage of qualified industrial teachers, there are many types of teachers to keep open and operate industrial classes. Some colleges are now suggesting that there should be a five year program established for the training of teachers. This is a fine bit of theory but certainly is one which will not induce students to spend one more year getting the bachelor's degree and then not have any better opportunities than they have now. There are entirely too many teacher training institutions attempting to train industrial teachers with untrained staffs and poorly equipped shops and laboratories.

College Teachers and Students Should Know Industrial-Arts Objectives

The following list of objectives for teaching industrial arts was recently released in a bulletin entitled, "Improving Instruction in Industrial Arts." This was developed by the Industrial-Arts Division of the American Vocational Association. The objectives are:

1. Interest in Industry. — To develop in each pupil an active interest in industrial life and in the methods and problems of production and exchange.

2. Appreciation and Use. — To develop in each pupil the appreciation of good design and workmanship, and the ability to select, care for, and use industrial products wisely.

3. Self-discipline and Initiative. — To develop in each pupil the habits of self-reliance, self-discipline, and resourcefulness in meeting practical situations.

4. Co-operative Attitudes. — To develop in each pupil a readiness to assist others and to join happily in group undertakings.

5. Health and Safety. — To develop in each pupil desirable attitudes and practices with respect to health and safety.

6. Interest in Achievement. — To develop in each pupil a feeling of pride in his ability to do useful things and to develop worthy leisure-time interests.

7. Orderly Performance. — To develop in each pupil the habit of an orderly, complete, and efficient performance of any task.

8. Drawing and Design. — To develop in each pupil an understanding of drawings, and the ability to express ideas by means of drawing.

9. Shop Skills and Knowledge. — To develop in each pupil a measure of skill in the use of common tools and machines, and an understanding of the problems involved in common types of construction and repair.

Teachers frequently return to college for graduate study in the summer and are

wholly unfamiliar with this bulletin or its predecessor, and do not realize that there is an established list of objectives toward which they should be striving as teachers. This is a deplorable condition but it is one which can be helped through our teacher training institutions.

College Teachers Must Display Superior Teaching and Organization

If improved high school instruction is to be developed, it certainly is the responsibility of college industrial-education teachers to provide leadership in methods of teaching and organization which should be in evidence in every lecture and demonstration. One cannot imagine why a college should not be developing the following:

a) Well-prepared and well-executed demonstrations
b) Use of courses of study
c) Convenient methods of filing teaching materials
d) Individual record cards on students
e) A display of suitable projects
f) Use of audio-visual materials
g) Systematic tool arrangement plans
h) Suitable attendance check
i) Democratic student control system

All of the foregoing factors are expected of high school industrial teachers and they are only patterns or methods of teaching of what they have seen or may have been exposed to when they were in college. A teacher trainer need only visit a shop or laboratory which is being taught by a teacher who has just been graduated from college to observe that this is true. If the systems are good, the high school teacher will be successful, provided he has the other qualifications so desirable in teachers. If the high school teacher fails, it is probable that his failure can be traced to improper training in college.

Emphasis of Proper Hand and Machine Tool Skills

Industrial teachers are expected to possess skills which permit them to perform operations according to acceptable industrial standards. In the case of the industrial teacher, he will probably have knowledge and use of skills which he has acquired in college or in his high school years. A vocational-industrial teacher will of necessity have several years of satisfactory industrial experience to assist him in leading his students in doing work that is up to industrial standards.

Many of the high school pupils design, build, and carry home projects far superior to those of students in college classes.

Prospective industrial-arts teachers should have a review of all course content and skills in their senior year in some theory or practice course under the title of "General Shop or Laboratory," which will provide them an opportunity to start collecting and planning suitable drawings and other instructional materials to put into a portfolio which will promote a successful beginning in their careers of teaching.

Students Should Become Acquainted With Many Materials, Processes and Their Applications

The past decade has seen a decided shift in emphasis for the training of industrial-arts teachers. There is a tendency to acquaint present-day teachers with areas in wood, planning and drawing, metals, leather, plastics, ceramics, electricity, graphic arts, fabrics, and transportation (aviation and automotive).

This sounds like a tremendous undertaking for industrial students in the usual college offering of 35 to 45 semester hours in technical subjects. This would mean a spread of around four semester hours per activity. However, there are usually three or four major fields and the remainder are considered as minor, yet these should not be overlooked and the students should be given an opportunity to explore or delve into the possibility of including such material for a possible public school offering.

Students Should Know Relationship of Industrial Arts and Vocational Education With Other School Subjects, Including Guidance

Frequently shop or laboratory teachers are accused of being individualistic and refusing to co-operate with the leaders of the teaching staff and this attaches a peculiar stigma to the entire body of industrial-arts teachers. Prospective industrial teachers should be taught that this field offers practical applications of many of the principles which students gain from academic subjects and therefore they should be in a position to foster good will because of the realism which can be instilled in a school system through the proper co-operation of the practical arts subjects with general or academic education.

It becomes increasingly embarrassing to find industrial-arts teachers who think they constitute the entire field of vocational education and do not realize that there is a tremendous vocational education field which has national significance and which has assistance from the state and federal government through the Smith-Hughes, George Dean, and George-Barden Acts. These various vocational Acts have been established to assist states and localities to offer and promote vocational education in many fields and to assist in the training of high school youngsters who never expect to go to college but who will go to work.

It is also a program developed for the upgrading of certain employed people through part-time and evening schools. Industrial arts is one division of the practical arts field which may serve as an exploratory part for vocational training or for the student who merely wishes to have a general understanding of the industrial fields. Industrial-arts teachers, too, are in an excellent position to provide a fine program of guidance. However, it is noted that many of them fail to take advantage of this fine opportunity.

Course Making and Content Analysis

Prospective industrial-arts teacher students should be taught how to analyze shop subjects and how to classify them according to accepted teaching techniques. These students should be made aware that they are expected to exercise resourcefulness and initiative which requires considerable thinking, planning, and the organization of proper teaching materials.

The teacher training institution should be a center where industrial-arts teachers may expect to find new ideas, new teaching materials, and the latest of industrial processes in the teaching program. Teacher training institutions should be the first to experiment and inaugurate new ideas. For some unknown reason, many college teachers seem to feel so secure that they do not care to put in additional time outside of actual class lecturing and demonstrating to work with new trends. During the past few months a trip was made to study industrial-arts teachers in high schools to determine what possible contributions might be made in that area by the teacher training institution nearest them. It was

found that many of the high school teachers had accepted the beautiful dynamic color schemes suggested by several of our leading paint companies and were very proud of the general appearances of their shop. The particular teacher training center serving this area still had the old drab gray and black equipment which had not been repainted for years. This certainly would not seem to be a center where the industrial-arts teacher could seek the latest information about his field.

Students as prospective teachers should be led to collect industrial teaching materials through their various methods and organization courses, so that upon graduation they possess a kit which might contain some, or all of the following:

a) Job sheets
b) Project drawings
c) Tests
d) Typical progress charts
e) Sources for securing books, manuals, workbooks, free materials, and lists of industrial films

Most of this material will be developed in different teacher training courses; however, since the graduate is a definite reflection upon the department from which he is graduated, it should be the responsibility of the college department concerned to assist the student in securing this material before he starts his first job.

Selection of Proper Teacher Training Personnel

The teaching staffs of teacher training institutions are known as teacher trainers. Frequently this is an erroneous conception because some are not equipped to render the type of service that is so necessary for the training of sound prospective industrial-arts teachers. It does appear that a college industrial-arts teacher trainer should have had several years of satisfactory and successful teaching experience before attempting to place himself in a position of adviser on teacher training techniques.

The public schools serve as an excellent training ground for orienting prospective teacher trainers in the multiplicity of problems with which they are expected to be acquainted for possible advisement to college students. It also serves as an excellent system to determine those who will be successful teachers. Frequently teachers are temperamentally unfit to be classed as such, and they find it out only after their experiences in the public school. Then they must leave the teaching field for which they have prepared themselves, and find employment which is better suited to their specialities.

A teacher trainer in a college certainly must have mechanical skill which he can demonstrate in a superior manner to the students whom he is instructing. By permitting the potential teacher trainer to spend several years in the public schools he is able to develop many of the innate techniques to the extent that he becomes very proficient and he will be of far greater value as a teacher trainer than one who has just been graduated from college and then returns to teach at his Alma Mater. The latter practice is not extensive but it does not appear to be a suitable solution to the development and promotion of an efficient teacher training department.

A few years ago, the late "Skipper," Dr. Chas. R. Allen stated that teacher trainers owed it to their constituency to deliver more than teaching techniques and job performances. In his fine address it was pointed out that there are certain social and employment habits of which the teacher trainer must be aware so that his students will be conscious of:

a) Ability to get along with people
b) Willingness to work
c) Resourcefulness
d) Ability to utilize sources of information
e) Respect for the rights of others
f) Perseverance
g) Expressing thoughts clearly
h) Initiative
i) Ability to assume responsibility
j) Habits of promptness
k) Dependability
l) Acceptance of social standards
m) Desire to do a good job
n) Working for increased competency
o) Accuracy
p) Ability to adjust to changing environment
q) Self-reliance
r) Safety consciousness
s) Recognition of authority
t) Personal and job pride
u) Native attitude toward waste
v) Ability to mind his own business
w) Ability to exercise authority intelligently

This list contains only common sense values which any teacher should foster but it is all too evident that many do not.

Industrial Excursions

A teacher performs much in the same manner as he was accustomed to as a student and while it may be said that "imitation is the sincerest form of flattery," it can prove disastrous as well as beneficial. It is very difficult to accomplish the major objectives for industrial-arts teaching if one does not include visits to industry as a regular part of teaching, either on the public school or teacher training level. Prospective industrial-arts teachers will always agree that visits to industry were very educational and informative. They will have an opportunity to visit some of the related industries in their respective communities to give them a broader conception of the industrial-arts field. If a college program is planned with industrial tours as a part of the training program, the students will later as industrial-arts teachers make plans along similar lines. At least one or two such visits should be made annually.

Many colleges include visits to surrounding schools to study the industrial programs given there. This gives the students an opportunity to see the actual condition under which teachers operate.

It is known that certain of our graduate schools plan such programs during the summer as an essential part of the industrial-arts teacher's advanced program to acquaint him with modern conceptions and different types of programs.

Supervised and Cadet Teaching Experience

Practically all teacher training institutions are compelled by state certification laws to offer three or more semester hours of experience in actual teaching situations. This is commonly referred to as student teaching, cadet teaching, or supervised teaching. It is intended that this experience be in the public school system which will provide and enable the student to learn a few of the actual teaching problems under natural conditions. Programs of this type can be very successful if it is handled through a well-organized program and is conducted by one who is interested in this type of training, especially if he has been a successful high school industrial-arts teacher. It is noted, however, that many colleges take advan-

tage of the particular course and allow the students to do their *practice teaching* in college classes. This certainly is not conducive to the best development of public school industrial-arts teachers. It has been found very satisfactory to allow the student to have two semesters of experience under two varied conditions. Perhaps they may be in the general shop or laboratory of industry program and in the unit type shop.

A few colleges have excellent 9- and 18-week assignments in outstanding centers throughout their respective states. This situation provides a beneficial opportunity for the prospective teacher to work a full day under the actual teaching condition and provides for him an opportunity to view community life from the standpoint of the teaching profession. This period of time frequently assists the student to determine whether he wishes to continue his interest in the teaching profession or whether he should center his interest toward possible industrial employment upon graduation from college.

College Teachers Must Support Professional Organizations

There are numerous national organizations for the promotion of the teaching profession. Teachers are expected to avail themselves of these opportunities and pay their membership dues as well as attend conventions. The National Education Association, the American Vocational Association, and the American Industrial Arts Association are three of the most outstanding national organizations to warrant the support of industrial-arts teachers. It is these organizations which operate on a national basis and have much to do with federal legislation which are so beneficial to the teaching profession. Practically all states have their state teachers associations, and state industrial arts and vocational associations which operate much in the same manner as national groups and sometimes are affiliates of national organizations. These associations are of importance to the teacher of the respective states and should have the support of all college and public industrial-arts and vocational education teachers. The college student is well aware of the attitude of his teachers toward these organizations. For this reason, it is imperative that all college industrial-education teachers should belong and ally themselves with the welfare and development of a co-operative enterprise such as the professional organization.

Some states have district and regional meetings which too should receive a wholehearted support. Larger cities and the more densely populated areas have local organizations which should receive the participation and support of college staff members.

College Teachers Should Visit High Schools to Understand Teaching Problems

High school teachers are proud to have their shop visited frequently by those interested in training teachers. The college teacher can benefit tremendously from these visits and it should be the objective of members of all college-industrial departments to make an annual visit of several high school departments to learn and discuss current problems and to express an interest in the development of the younger teacher.

College Teachers Should Attend Summer Schools or Work in Industries

This statement may sound somewhat blunt; however, the progressive teacher is already participating in one or the other, or both activities during summer periods. Usually the public school teacher has only the bachelor's degree and it is to his advantage to attend graduate programs during the summer months until he gains his master's degree and then to combine his professional interest with an occasional summer of work in industry. It is this close connection with the professional upgrading and industrial activity that produces the better teacher trainer. Industrial-teacher training departments are only as strong as their staff members. The training of future industrial-arts teachers will depend upon the philosophies of the present-day teacher trainers. This postwar era will be responsible for the training of teachers and the type of programs which are expected by public school administrators and this training will depend entirely upon the facilities, both physical and staff which make it possible in our college.

Liability Suit Won by Teacher

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Academic teachers, administrators, and industrial-arts teachers in particular, will be pleased with the result of the lawsuit filed by a student through his parents, against an industrial-arts teacher of this city, and which has been pending since the spring of 1949. The case which was tried in the Circuit Court of this city and appealed by the plaintiff to the Supreme Court of this state, has finally been settled in favor of the teacher.

In legal references this lawsuit will no doubt be referred to as the Gerald Grosso, student, versus Henry Wittemann, teacher, case, or more commonly as the "Acids Case."

In filing his complaint, Grosso claimed that the teacher was negligent in permitting him (Grosso) to go into an oil room which was unsupervised, in which there was an unlabeled and uncorked bottle of acid. That the bottle was uncorked was never proved in court, although there was no denial that it was unlabeled. The facts of the case are very simple, and were based on the common law of negligence, and not on any statutory law; and are as follows.

At the end of the first semester in Janu-

ary, 1949, Henry Wittemann, the defendant teacher, Gerald Grosso, the plaintiff student, and Thomas Shong, another student, were cleaning out the oil room when they found an unlabeled bottle of acid. Wittemann told the students it was acid, and that it would have to be dumped on the ash pile in the boiler room. The three proceeded to the boiler room, but when they discovered that there weren't any ashes present, Wittemann returned the bottle to the oil room and told the students he would wait a few days and dump it when there were ashes present. Both Grosso and Shong were with Wittemann and saw him place the bottle back on the shelf.

On January 24, about two or three days after the above incident, Wittemann again had occasion to go into this oil room. Again these same two boys were with him. In stepping into the oil room, Wittemann slipped on some wax that had run out of a mop that was standing in a corner. Wittemann remarked, "I must clean that up before somebody gets hurt." Immediately these two boys volunteered to do the job. It was only after Wittemann had their assurance that they would not get into difficulty, that he permitted them to do the job. He instructed them in the manner of removing the wax, and left them, to return to the shop proper where the rest of the class was at work. In the cleaning process the boys used two small pieces of scrap wood for scraping the floor. After a few minutes Wittemann checked on the boys, complimented them for the nice job they had done, told them to pick up the refuse, take it to the boiler room, and return to the shop as soon as they had finished. At this time neither boy had any acid on him.

When the boys didn't return in what Wittemann thought was a reasonable time, he was about to check on them again. Just then they returned to the shop and informed him that they had spilled some acid on themselves. The exact manner in which they came in contact with this acid is still a mystery and known only to these two boys, Grosso and Shong. It was established in court, however, that they were engaged in a friendly scuffle, and in the process the bottle was knocked from the shelf. Neither would admit catching the bottle as it fell; it didn't break, although if it fell at all, it must have fallen from a shelf 54 in. above the concrete floor. It left a spot about the size of a half dollar on the floor, and was back up on the shelf after Wittemann and the boys went back to see what had happened.

Wittemann then sent the boys to the school nurse, who advised the boys to go into the lavatory and wash off the acid. In the meantime, the police ambulance was called and the boys were taken to the Emergency Hospital, where they were given first-aid treatment for first degree burns, and released about an hour and 45 minutes later.

One of the boys, then 16 years of age, commenced action in the Circuit Court of Milwaukee against the teacher, alleging that he had sustained and suffered severe burns, pain, and shock, and said student and his parents sought recovery in the action against the teacher of damages in the sum of $5,500. In this action the student did not attempt to obtain recovery against the School Board or against any employee or representative of the School Board, other than the industrial-arts teacher.

Within a short time after the commencement of the action, negotiations took place between the attorney for the plaintiff and an Assistant City Attorney then representing the defendant Wittemann. As a result of this conference, the said Assistant City Attorney recommended to Wittemann that he settle the action by making a payment in the sum of $650 to the plaintiff.

Mr. Wittemann was deeply convinced that he was not at fault in any manner. He found it impossible to follow the suggestion of the Assistant City Attorney, and engaged other legal counsel prior to the beginning of the trial.

Trial of the action was started before Judge William I. O'Neil on January 14, 1953, and jury verdict was entered on January 21, 1953. The verdict of the jury was to the following effect:

1. That the defendant, Henry Wittemann, *was* negligent as to the manner in which he placed and maintained the bottle containing acid on the shelf.
2. That said defendant *was not* negligent with reference to warning the plaintiff Grosso that the bottle on the shelf contained acid.
3. That the negligence of Wittemann as to the manner in which he placed and maintained the bottle *was* a cause of the accident and resulting damages and injuries.
4. That the plaintiff Grosso *was* negligent in failing to exercise ordinary care for his own safety and protection.
5. That such negligence on the part of the plaintiff *was* a cause of the accident and resulting damages and injuries.
6. That the proportion of the negligence was as follows:*

   Henry Wittemann 55 per cent
   Grosso 45 per cent
7. That the damages sustained by plaintiff were $750.
8. That the damages sustained by the father of Gerald Grosso were $80 (answered by the court).

*A 50–50 verdict would have nullified the case.

A day trade student learns to bore accurately to caliper measurements. Wm. Mieszczak, instructor. Submitted by John F. Jeffery, director of vocational education, School District, Erie, Pa.

On May 15, 1953, Judge O'Neil overruled the 55–45 verdict of the jury, and entered a decision in favor of the defendant, Henry Wittemann, the teacher. It was on the basis of this decision that the complainant appealed his case to the Supreme Court.

A word of explanation may be necessary in the 55–45 verdict of the jury. In this state, juries determine the degree of negligence on each party. A fifty–fifty verdict as has been previously indicated nullifies the case, because each party is held equally negligent; therefore no case.

In affirming the decision of the lower court, Judge Broadfoot of the Supreme Court, on February 1, 1954, wrote as follows:

> In order to substantiate his claim of negligence that the defendant placed and maintained an open bottle of acid upon the shelf, it was the duty of the plaintiff to prove that the defendant did place an open bottle thereon, or that he knew or should have known that the cork had been removed. There is no such testimony. When and under what circumstances the removal took place, if it did, is completely speculative. We consider the learned trial court was right in holding as a matter of law that the plaintiff had not met his burden and proved negligence on the part of the defendant.
>
> That conclusion makes it unnecessary for us to review the determination of the trial court that the accident resulted from a scuffle and that said scuffling was an intervening cause of the accident. The plaintiff failed to establish the allegations of his complaint and the same must be dismissed as the trial court directed.

Of such deep concern was this case to the school employees of this city, that under the guidance of the Industrial-Arts Teachers' Association a defense committee was organized to collect funds and lend moral and financial aid to Mr. Wittemann. Without any difficulty, a legal defense fund of $2,100 was raised to fight the case. This money came from teachers, school secretaries, school engineers, administrators, school cooks, and their assistants. The money was administered by a legal defense committee, made up of representatives of each of these employee groups. The unanimity with which all groups came to the support of a fellow worker is indicative of the spirit and interest this case had created.

The lawyer, Emory Porter, who defended Mr. Wittemann, was a former school teacher, and had a background which ably fitted him for this case.

Origins of Public Industrial Education in Philadelphia

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(Continued from page 42 of the February, 1954, issue)

Board president Steel continued his criticism of the academic bias of the elementary school curriculum. In 1885 he observed "If erroneous views of labor exist in the minds of young people, the system of education which their elders have devised is greatly responsible for it." The James Forten Elementary Manual Training School was finally opened in 1891. The school was in a neighborhood having a large population of Negroes and immigrants. Teachers visited the streets and alleys of the neighborhood, "inviting" children to register. The school developed, and soon was used as a center for teaching students from other elementary schools. Drawing and woodwork were taught from one to four hours a week. A modified Sloyd system patterned after that developed by Gustaf Larson of Boston was employed. Exercises were incorporated in the form of small useful articles and models. During these early years manual training for girls was discouraged. By 1913 ten shop centers for boys were operating in grades 7 and 8. The opening of the first junior high school (Oliver Wendell Holmes) in 1917, provided electrical and woodshops for all boys in grades 7 and 8, with household arts for girls. The spread of the junior high schools continued until now there is an extensive 6–3–3 school organization. Nearly all the boys have shopwork in the seventh and eighth grades, and many elect such work in grade nine. The instruction has exploratory and other general education aims.

In 1898 the first Philadelphia public vacation school was opened in the Livingston School at 23rd and Callowhill Sts. Classes were held in the morning, with the aim of counteracting the unwholesome influence of the street. Boys were taught carpet weaving, the making of kites, letter holders, flower racks, and other articles. Girls learned household skills. Activities for boys and girls included drawing, modeling, nature study, music, and weekly excursions.

On the high school level, various groups continue to pressure the board of education on the matter of having Central High School offer manual arts instruction. Edward Steel was still president of the board, and his interest remained unflagging. Superintendent James McAllister, who had come to Philadelphia in 1883 from Milwaukee recommended that the board of education open a manual training school on the high school level. In September, 1885, the Philadelphia Manual Training School was opened in the old Hoffman Elementary School Building at 17th and Wood Sts. It was the second school of its type in the country to be supported at public expense, one in Baltimore having opened a year before. Naval Lieutenant Robert Crawford, who had been superintendent of the mechanical department at the Spring Garden Institute, was chosen as director, with William L. Sayre as assistant. When Lt. Crawford was recalled to active duty in 1887, Mr. Sayre became principal. The school day was six hours long, with three hours of academic study, two of shop, and one of drawing. During the first year the pupils studied simultaneously joinery and metalwork. In the

second year there was tinsmithing and forging along with patternmaking. The principles learned in the first and second years were applied to modelmaking in the third year. Science instruction included elements of mechanical and electrical engineering. Drawing was mechanical and freehand, including decorative design. The curriculum did not overlook industrial visits. Sayre set forth the following as an objective: "The manual training school is not a trade school, but a school in which the principles underlying all trades and occupations are taught." The purpose was not to produce mechanics, but to ready boys for *manhood*. Boys who wanted to learn a trade were not expected to do so in school, but on the job.

Enrollment became so large, that another school was opened in September, 1890, at the Lea School Building, on Howard St., below Girard Avenue. The new school was named the Northeast Manual Training School, while the other was now called the Central Manual Training School. In the beginning Mr. Sayre was principal of both schools.

The Southern Manual Training School was opened in 1907, at a time when the board policy was that high schools should be comprehensive in nature. Arguments for the comprehensive high school were economy, and the attitude that separate schools foster aristocracy in education and class prejudices in pupils and parents. The new Southern Manual Training School therefore had academic, commercial, and manual training departments. By 1912, Northeast Manual broadened its curriculum, lengthened its instruction from three to four years, and became known as the Northeast High School.

In 1912 also, Central Manual Training School was disbanded. Its principal (Wm. Sayre), and many of its faculty and students were transferred to the new West Philadelphia High School which opened in September, 1912. Some of the faculty remained, at the 17th and Wood Sts. building and formed the mechanic arts department of the old Central High School. The building was taken over in about 1915 as an annex by the Philadelphia Trades School, and the Central High shops were moved to Broad and Green Sts., just across the street from the main Central High School Building. Central High School continued as a comprehensive high school until 1939, when it moved into new quarters, and became an academic high school for boys.

As other high schools opened, the manual-arts program became more generally known under its present name — the mechanic-arts curriculum. Graduates of the mechanic arts program are prepared for college entrance in engineering, industrial research, or other technical professions.

Professor William C. Ash

Private Nondenominational Trade Schools

Despite the foregoing history of manual-arts education, the modern public vocational schools in Philadelphia appear to have had their impetus largely from the success of nondenominational private schools. These began in the 1880's.

In 1884 the Master Plumbers' Association of Philadelphia opened a trade school for plumbing. There were evening classes for pupils whose ages averaged between 16 and 20 years. In 1886 a literary society was begun. There was a circulating library, and essays and debates were prepared on matters relating to plumbing. The next several years were uncertain, and in 1890 it was voted to merge with the school of the Master Builders described below.

Charles F. Bauder

Colonel Richard Auchmuty of New York in 1888 invited a committee of the Master Builders' Exchange to visit his tuition-paying trade school which he had founded in 1881. Auchmuty was a millionaire contractor who had considerable trouble with striking labor. He sold his business and interested himself in short term intensive training for trade proficiency. A bricklayer, for example, was trained 8 hours a day for six months. He was convinced that this procedure was more efficient than the apprenticeship of younger people over a period of years. Although Auchmuty was not actuated by altruistic motives, the result of his activity was beneficial ultimately to vocational education. The Philadelphia committee was highly impressed by Auchmuty's school, and in 1890 the School of the Master Builders opened, backed partially by a subscription by Colonel Auchmuty of $3,000 per year for three years. The purpose of the classes was to prepare apprentices in building trades. Instruction was offered in carpentry, plastering, bricklaying, plumbing, stone cutting, blacksmithing, and painting. Financial support, including most of the tuition, was provided by the trade associations of the exchange. Attempts to secure state aid were defeated, and in 1899, the school was suspended. During these years there first appeared on the educational scene the notable figure of Murrell Dobbins. He was an apprentice bricklayer, then a successful master. In 1892 he was elected president of the Master Builders' Exchange. Dobbins later became an influential contractor and owner of the Camden Pottery, the largest individually owned establishment of its kind in the United States. Meanwhile he continued to grow in his understanding and zeal for industrial education in schools. As will be seen, he had much to do with the eventual opening of Philadelphia's first public trade school.

Isaiah Williamson was a wealthy Philadelphia merchant who had for some time felt concern over the decline of trade apprenticeship, and also over the fact that school education seemed to cause students to doubt the respectability of manual labor. There gradually developed in his thinking the idea of founding a trade school in or

near Philadelphia for deserving boys. Trustees of the proposed school met in 1888, and more than one-and-a-half million dollars in securities were set aside. Boys between 15 and 18 years of age were apprenticed to the board of trustees for three years, during which time they were clad, fed, and lodged. After careful study and planning, the school was opened in 1891 near Media in Delaware County. Bricklaying, machine work, and woodworking were the first trades offered. Power plant operating was added later. The school has been very successful, and numbers many leaders in industry and vocational education among its alumni. A forward looking feature of the school has been its close follow-up of graduates.

John Wanamaker, the famous Philadelphia merchant and a close friend of Williamson, also interested himself in industrial education. He was in fact, for many years chairman of the board of trustees of Williamson Trade School. He developed the Wanamaker Institute of Industries in 1908 out of a church school called Bethany College. The college had been founded in 1891, and evening classes were conducted in stenography, garment cutting for men, drawing, music, and general education. Under Wanamaker the school moved to several different sites before settling at 23rd and Walnut Sts. Rudolph Walton, a prosperous hatter, endowed the school, and the death of his widow in 1915 released about $200,000 more. Morning, afternoon, and evening courses were offered for many years at nominal tuition to men and women in skills such as bookkeeping, architectural drawing, dressmaking, watch repairing, men's garment cutting, and many others. Wanamaker Institute courses are still being offered as part of the Philadelphia public schools evening school program.

Early in the century various local industries established their own plant industrial schools. By 1909 the Philadelphia Naval Base had an apprentice school offering toolmaking, machine work, rigging, electricity, plumbing, cabinetmaking, sailmaking, boilermaking, and other trades. Related instruction was provided in mathematics, drawing, and later in English. During the two world wars, co-operation was close between the Naval Base program and the Philadelphia vocational school and high school personnel.

1906 — America's First Public Trade School for White Boys Opens

With such a rich background of privately sponsored activities in industrial education, it might seem logical and inevitable that public schools would appear. They eventually did, but not without a struggle that even today must be unrelenting. Murrell Dobbins had, since the suspension of the Mechanical Trades School of the Master Builders Exchange in 1899, been an unflagging champion of the cause. In January, 1906, he became a member of the Philadelphia board of education, and lost no time in presenting a resolution calling for a system of mechanical trade schools. He pointed out that several centrally located elementary school buildings were soon to be vacated and available. Resolutions of trade groups endorsed the idea. The new superintendent and board of education were receptive, and it was agreed to establish the Philadelphia Trades School at 12th and Locust Sts.

The equipment of the Mechanical Trades School, which had been idle since 1899 was offered to the board of education and accepted. The sum of $10,000 was allotted for readying the building, and $11,500 was provided for salaries of teachers and janitors. Teachers classified as master mechanics received $1,200 per year, and assistant instructors received $900. The first principal, William H. Odenatt, was brought at a salary of $1,500 from the Northeast Manual Training School.

Thus opened modestly in October, 1906, the first public trade school for white boys in the United States. A public trade school for colored boys and girls had opened just a month earlier in Columbus, Ga.

School hours were from 8:30 to 4:30 p.m. A minimum age of 15 years was set, admission to be determined upon evidence of fitness to pursue the work of the school. The program was three years long, and extended 35 clock hours per week. Sixteen hours were allotted to shopwork and five to drawing. The remaining time was devoted to English, applied science and mathematics, study of business, and economic history. Among the trades offered were architectural drawing, mechanical drawing, electrical construction, carpentry, patternmaking, and printing. Student activities included athletics, class associations, clubs and a student magazine, among others.

After only one year of operation, the principal and several of the teachers transferred to the new Southern Manual Training School. The Philadelphia Trade School teachers suffered then and for many years from a salary discrimination. September, 1907, saw Wm. C. Ash, described by Dobbins as "a fine young electrician" when he recommended him to the board of education, as the new principal. This was a happy choice. Throughout the existence of the school, and in subsequent important posts, Ash exerted an influence which entitles him to stand beside Dobbins as a great leader in industrial education. Under Mr. Ash's direction the school attracted local and national recognition. Enrollments increased, and annexes were opened at 17th and Pine and 17th and Wood Sts. in about 1915.

For several years a preparatory department was maintained for overage boys nominally of seventh-grade background who were not suited either for the trade training classes or for the manual training high schools. By 1916 the seventh- and eighth-grade shop programs were sufficiently developed for boys in the elementary schools, that the Trades School could erect entrance requirements comparable to those in high school. Here was an early application of the now almost axiomatic view that skilled artisans and craftsmen are developed from basically normal boys having rather definite aptitudes and motivations.

It has been noted that manual training shops had been functioning in the comprehensive high schools. In 1916 the president of the board of education suggested that the existing mechanic arts shop facilities of the high schools could be utilized to give trade instruction to boys having employment rather than collegiate objectives.

On February 1, 1919, the Philadelphia Trades School went out of existence, becoming part of the industrial department of the Central High School. The faculty benefited in being placed on the more favorable high school salary schedule.

Despite the relatively short existence of the Trades School, the extent of its influence is difficult to estimate. Many of its practices were widely copied in the later Smith-Hughes vocational schools. Its graduates not only were successful in trade fields, but some became teachers and leaders in industrial education. Elmer H. Briggs, the present principal of one of Philadelphia's vocational schools, was first a graduate, then an instructor in the Philadelphia Trades School. Dr. Edward M. Fee, another graduate, is principal of another Philadelphia Vocational School, and author of an excellent history of industrial education that was used freely in this paper.

Industrial programs were soon set up in the Northeast, Southern, and Frankford high schools. Expansion continued, and industrial curricula are now found in the majority of Philadelphia's senior high schools. The high school day is five hours long, and the auto mechanics, building construction, electric construction, and

mechanical construction shops each are offered between 7½ and 11 clock hours per week. It is apparent that these do not meet Smith-Hughes requirements, and there is no attempt to do so. Because of many limitations, including inability to select students, these high school industrial curriculums are not really effective in achieving vocational goals.

Coincident with the merging of the Trades School with Central High School, Professor Ash was appointed director of vocational and practical arts education for the city of Philadelphia. He did important work in this capacity until 1922, when he left in order to organize and direct the department of vocational teacher education at the University of Pennsylvania. Here Professor Ash discovered, encouraged, professionalized, and placed hundreds of outstanding teachers until his retirement in 1946. Charles F. Bauder, a former teacher in the Philadelphia Trades School succeeded Ash in the Philadelphia school system, under the title of director of industrial arts. Mr. Bauder continued his administrative responsibilities until his retirement in 1952.

Beginning in 1922, seniors in the industrial department of Central High School were employed in industrial firms for two-week periods alternating with two-week periods in school. Soon, more than 40 industrial establishments co-operated, and later in the decade the practice spread to other senior high schools. Follow-up studies gave evidence that the program was a success. Meanwhile enrollment increased constantly in evening shop classes and in part-time extension work. The early apprentice classes in plastering, plumbing, and printing were especially successful. The great depression of the 1930 decade dealt a severe setback to both the co-operative work program and evening school enrollment.

(To be continued)

Practice vs. Theory

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"He is the best teacher whose pupils most quickly outstrip him." So spoke Socrates some centuries B.C. And in this hurry-up twentieth century we are still trying to find out all that he meant. If we are going to measure the quality of teaching by student accomplishment, then grades and general understanding can point back to how well the teacher did his part. For purposes of our present discussion we may rule out the factors of health, equipment, programming, extraneous duties, etc., that bring in numerous variations in learning. And for the purpose of more specific discussion let us confine our thinking to practice versus theory as a preparation for teaching. This is of particular significance to practical subjects instructors.

The Problem Stated

What does the school of hard knocks do for us? And what do the ivy towers of theory contribute to a preparation for life? If we can properly appraise these two factors in education, the problem of teacher training will stand in clearer light. Historically the plan has been to send a student away to college to prepare for his place as a teacher, lawyer, doctor, engineer, according to parental ability to pay and some inclination on the part of the youth. Fundamentally that was correct as far as it went. The training school was the center of learning and had the accumulated wisdom of the race in its keeping. But many times a young man or woman could not finance such a program. Within the memory of the older generation now living, pupils were graduated from the eighth grade in a rural school in June and taught in the same school in September. The board reasoned that the teacher was a graduate, had learned it all and could teach the classes. The author was a pupil in rural schools where this practice obtained. To argue the validity of the plan is beside the point. The idea was an accepted fact, and some of those teachers continued, measuring up rather well in that day. We are coming to see that the experiences of life come from all the contacts made, be it plowing a field or reading a book about agriculture. Our discussion here may profitably be concerned with how much of pure theory and how much of "practical" experience will make up a successful program of teacher preparation.

Some Theories

We may now examine a little more closely some of the thinking about who is qualified to teach. Over the years the community has accepted a new appointee as he came to take charge of the classes. He had been duly hired, was accredited by the standards of the time and was correct in general aspects. During succeeding months he either won his way with students, fellow teachers, principal and community or he failed to measure up. To try to analyze all the factors that contribute to success or failure in these circumstances is beyond the scope of this paper, but a comment or two about practice vs. theory may cast some light on the matter and enable us to deal more definitely with similar cases.

A general education does not always fit a person to teach. Ruling out personality factors, as already mentioned, we still have the problem of adequate preparation in subject matter. And subject matter is closely associated with the needs of the

class, as indicated by age of students, length of course, equipment available, etc., all of which will vary from time to time and from place to place. This means that a teacher may be well prepared in the initial skills of an occupation, avocation, or cultural subject and yet be a poor teacher for some classes. A history or geography teacher in the grades may be excellently capable in those grades but may not be suited to a more thorough treatment of the subject with older and more experienced students. A shop teacher may have excellent skills in the fundamentals of an occupation and be a strong teacher in the grade school or high school, but not be prepared to teach in the same field with some classes of adults. The converse is also true. A part of this depends on the teacher's preparation in subject matter, and a part depends on methods of teaching, equipment, and other factors. There has also been the belief among many people that anyone who knows his field can teach it. There are many fine examples to support this idea. But to set it down as a general statement would certainly be wrong.

There are some fallacies among these theories. In attempting to sort these out and classify them we find that no hard and fast rule obtains. Thus, the theory that an expert mechanic will make a good teacher may be fallacious in one situation but true in another. Many contributing elements enter the picture and affect the final score. General conclusions can be reached, however, after observing many cases. Let us now look at some case histories by which to appraise the validity of practice versus theory in the matter of teacher preparation. The author cites here three cases known to him.

Mr. *A* applied for a position as a shop teacher. The interview disclosed that he was a graduate of a four-year training course in a fine training school. He was prepared, as he thought, to teach the practical phases in several industrial fields, including the usual related subjects, mathematics, drawing, and trade science. His personality and general bearing were excellent. The discussion with him touched on the matter of teaching certain difficult job processes, such as would arise in a class with adults. He was plainly beyond his depth and recognized the fact that his training had prepared him to teach only the fundamentals of several trades. Therefore he would be more successful with grade and high school pupils than with experienced adults. He lacked the solid foundation of trade experience.

Again, a skilled shop man was hired to teach a class in his trade. The students were young beginners. The teacher had difficulty in separating the easy, initial jobs from those more difficult. To him all jobs were in the day's work and ranked on a par in importance. The natural inquisitiveness of the students annoyed him. He had difficulty in discerning when some related theory should be introduced to clarify a process, and more difficulty in trying to explain the related material. The results were not satisfactory. As a good workman he excelled. As a teacher he failed.

A third case is that of a young woman graduate, with a Ph.D. in mathematics. Excellently prepared in the field of pure mathematics, she desired to teach courses in practical shop calculations. Much of the work would go no further than simple equations in algebra and some applied trigonometry. The interview with this applicant revealed that she could not visualize the problems involved in shop applications, was not familiar with shop processes and terminology and was not prepared to teach a class of shop people in applied calculations. She was prepared to teach in the field of pure mathematics.

What can we deduce from these situations? Certainly the door is not closed to the young man in the first case. He could still gain the practical experience. Many young teachers have done just that and have succeeded. The skilled tradesman in the second instance could prepare himself in the related fields, could master teaching methods and should become a successful teacher. The applicant in the third instance could also gather some applied knowledge, although her preparation was primarily in the field of pure mathematics.

The Ideal Situation

Can we find a happy medium? Can we write the specifications for an instructor who will have the proper balance between theory and practice, and a sufficient amount of each? Manifestly the ratio between them will vary with the demands of the job. To begin with, it should be clear that no teaching job can rest on theory alone. Instruction is imparted to enable people to deal with life situations. The writer was once a student in a university class in college algebra. In a moment of perplexity a bewildered student blurted out, "Professor, in what department of human works do we ever use all this?" Apparently the professor was caught off balance. With some hesitation he offered the weak answer that it was good mental gymnastics. College algebra still has a place, but that teacher failed to see it.

And we cannot rest on practice alone. Applied knowledge in any field is concerned with output, with production, with work. But it can operate only after pure science has paved the way by setting up the guide posts of general understanding. After the basic know-how has been established, production can start. Specifically, in many classroom situations, in the midst of a practical demonstration, a student will ask why. The teacher should be prepared to explain why by tracing the steps taken in pure theory that lead up to a practical application. The ideal teacher, in addition to other good traits not discussed here, will have a sufficient stock pile of both theory and practice and will know how to draw on each judiciously.

Can we reach the millennium? How can we develop a teaching staff, facilities, programs, etc., so that students will be properly prepared in theory and practice? Particularly in this discussion we are thinking of vocational classes where the applications to workaday activities present themselves continually.

All movements start with leadership. If a school system is lacking in any of the desirable qualities, someone must lead the way to improvement. Reforms cannot be made overnight, but need time for development. An administrator without vision, and courage, a faculty lacking initiative, a community wedded to the status quo are not conducive to progress.

Let us discard most of the factors that may cause poor teaching and look squarely at the instructor. If his preparation has been largely along academic and theoretical lines, with a moderate amount of practical experience, the solution is for that man to acquire the experience he needs. Vacations spent in industry or an extended leave of absence to work at the occupation he is teaching will give him the background. Likewise, the teacher with long practical experience may be short on theory, on the general cultural subjects and on teaching methods. He will profit by vacations and other spare time spent in college to round out the weak areas. Teachers and communities need to recognize that weak instruction results in a weak product.

The Present Status

Vocational and technical schools are approaching the desired goals. Progress is measured by a comparative method, and we need only to look back over the years to find out how well the schools have advanced. Some decades ago there were few facilities for training an experienced practical man or woman in the theory of

teaching. These people were hired to take over practical subjects classrooms and work out their own procedure. The training schools had not developed a satisfactory plan for offering teacher training courses for these people. And the inclination on the part of the teachers to acquire professional improvement had not yet come. It was largely a case where experimentation was first necessary before improvements could be made.

But changes have been taking place. School administrators have been discovering the kind of practical subjects to offer, the public is supporting the plan, and training schools are better prepared to train teachers. State and federal regulations reflect a better understanding of the problem in passing rulings to require a more thorough preparation, practical and theoretical, on the part of teachers in these new areas. Employers are more alert to the possibilities of training as a direct step to employment. We have now arrived at the point where applicants with desirable qualifications are seeking to become teachers. Since the level of general education is higher than it was a generation or more ago, people with sufficient practical experience have a better start toward completing the required professional training. Also, opportunities are better for teachers already in service to secure the practical experience.

The Place of Apprenticeship

Apprenticeship as a preparation for work has taken hold of our thinking in the United States. For many years our industries depended a great deal on the immigrant craftsman from Europe, but that source began to dry up some time ago. The industries are now looking more to a plan of creating a new supply of expert workmen here at home. Both employer and employee recognize that a thorough preparation on the job is essential to production and our American standard of living. As mentioned already, apprenticeship is a prerequisite for entrance into some teaching jobs in practical subjects classes. Not only is the workman thoroughly trained by this plan, as far as processes are concerned, but he can also appreciate the problems of learning confronting the young man who will follow after him. This point of view will help him when he becomes a teacher.

These comments on the place of apprenticeship in the plan of preparation for teaching practical subjects are intended to emphasize the fact that industry provides a phase of training that cannot be duplicated in a school. It is this thorough grounding in the processes of the occupation and the balanced judgment developed in the workman that strengthen him in the many problems that come to anyone in charge of a classroom.

Balancing Theory and Practice

Who is to decide on the ratio of theory and practice? Can we develop a common measuring stick to determine quality and quantity of preparation? What shall school administrators look for in building a faculty? These questions loom large on the front line in school organization. As in many other activities, rules break down somewhere. The peculiarities of a given situation may alter the procedure. But standards are necessary for general guide posts along the way. They appear in the requirements of state and national boards of education. They are found in the plans of associations of colleges and secondary schools. And they are reflected in the training curriculums of teachers colleges.

Experience is a great teacher. Sometimes the tuition is costly, but we do learn by the process. The real conclusions are reached by the method of cut and try. School administrators and classroom teachers are discovering what is needed for preparation and are asking that facilities be provided for securing it. In turn, teacher training institutions are improving their offerings. The public has also learned to accept the practical subjects teacher on a par with instructors trained in the theoretical fields. The total faculty contributes to the program of education. This means that all who teach need a proper balance in their own understanding.

Opportunities in Forestry

ERNST H. SUERKEN
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Union Free School District, Greenburgh Eleven
Dobbs Ferry, N. Y.

Few professions have grown in size, scope, and prestige more rapidly than forestry during the past half century. From a mere handful, the profession has increased to more than 13,000 members. In industry, government, and education, foresters now occupy key positions. This fact reflects an ever growing public awareness of the need for husbanding our forest resources.

Forestry as generally understood means the wise, continuous use of our forests and their products for human benefit. Two concepts need particular emphasis — sustained use at a high level of production, and multiple use. The wood that forests provide is one of our most useful and important raw materials. Forests also stabilize soil, protect watersheds, help prevent floods, provide homes for wild life, offer recreational and aesthetic values, and produce forage for livestock. To perpetuate these products and services requires high technical performance by foresters.

Forestry does not end in the forest. Timber must be logged, transported, sawed into lumber, or made into veneer, paper, and other products. Secondary processing may involve seasoning, gluing, preserving, laminating, and finishing to produce useful articles. Such activities require technical knowledge and good business management.

Colleges of forestry provide education leading to a bachelor of science degree in forestry — a basic requirement for entering the profession. Specialized four-year curricula have been developed to provide the training needed in the various fields of forestry.

Work and Career Opportunities

Forest Land Management: A forest land manager grows timber crops. He seeks also to obtain other benefits of forests. He is responsible for all resources and activities that occur on the land under his jurisdiction. His training provides him with a general background in sciences related to forestry. Specifically, he learns how to survey, protect, and organize forests so that timber and other crops may be efficiently produced.

The chief federal agencies using land managers are bureaus in the Departments of Agriculture and Interior, and the Tennessee Valley Authority. States, some counties, and an increasing number of industries employ men to manage forests. Employment opportunities for forest managers can be expected to increase. More and more owners of our commercial forests are realizing the wisdom of good care.

Landscape and Recreational Management: Public use of forest areas, parks, and highways for recreation during the past two decades has greatly increased the need for foresters trained to solve landscape and recreational problems. These men design, construct, operate, and maintain forest and city parks, parkways, and other recreation areas and facilities. Knowledge of forestry is desirable to understand the problems of land and resource use of large areas. To this is added training in design, construction, plant materials, park administration, and recreation programming. Emphasis is placed on graphic presentation of ideas.

Employment opportunities in this area are as landscape architects, landscape engineers, recreation planners, site planners, regional planners, park engineers, and park superintendents. Opportunities exist in many government agencies, park departments, highway departments, and private offices.

Forest Utilization: Forest utilization includes the harvesting, processing, and sale of forest products. It begins with the logging of timber and includes its conversion into consumer products, whether this be rough lumber, finished homes, or furniture. Technical knowledge is required to log, saw, season, and remanufacture lumber, to cut veneer, and to fabricate finished articles of commerce from the raw materials supplied by the forest. A knowledge of business methods is also needed if these operations are to be economical and profitable. Employment is in logging, sawmilling, and wood-processing plants or as independent operators.

Wood Technology: Wood technology is concerned with research and development problems of wood-using industries. Wood technologists are foresters with a detailed knowledge of wood superimposed upon engineering training. Its graduates become the wood research specialists who determine new uses and methods whereby wood can better serve mankind. Their training emphasizes the physics and chemistry of wood. The employment opportunities are largely with the large wood-using industries, or with government.

Pulp and Paper Technology: Pulp and paper manufacture ranks with the largest industries in the country. Men must have highly specialized training to manage and control the many complicated operations which characterize the modern pulp and paper mill. Pulpwood must be bought and debarked, pulps produced and processed, and a variety of paper and paper products manufactured by complex handling procedures and machines. Necessary training includes chemical technology, wood chemistry, bleaching, mill management, and considerable mill experience.

Each year new uses for paper and paper products are found. The huge investments represented by the many pulp and paper mills throughout the country reflect the stability of the industry. Working conditions are similar to those of any large industry. Qualified men enter the paper industry as control chemists, research chemists, and assistants to foremen or the superintendent.

The salaries in forestry compare favorably with those in engineering and other professions requiring a similar degree of competence. The beginning annual salary in federal service is $3,410. Entering salaries in state service and the wood-using industries tend to be somewhat lower than those in federal service, while salaries in pulp and paper manufacture are higher.

A career in forestry offers many satisfactions other than money. Not least is the privilege of working with living things. Forestry is important work offering a stimulating challenge which offers an opportunity to relate one's profession to the common good of all, to increase the services of forests to mankind.

The following self-rating scale is based on the accepted principle that the process of vocational choice is essentially that of developing and implementing a self-concept. The process is carried out through imagining oneself in the occupational role — first in fantasy, then in serious consideration of jobs. The scale is designed as a preliminary guide for those who want to investigate their pattern of interest in forestry. You should seek further information and adequate counsel if your score on the scale indicates that you wish to pursue some phase of this vocation further. Remember that making a vocational decision is a most important and responsible action as it affects your welfare and happiness. Therefore, avail yourself of every opportunity to acquire all possible information and investigate further by consulting good vocational references and successful leaders in this particular occupation.

The scale includes scholastic requirements, physical requirements, mental requisites, personality requirements, special complementary abilities, compulsory complementary abilities, and native complementary abilities. In filling out the scale an arbitrary passing grade of 70 per cent has been established. Place your rating for each subject or requirement in the parenthesis provided. Each section should be averaged in the manner indicated and placed on the 0–100 scale provided.

FORESTER:

Scholastic Requirements: Grade school ( ) high school ( ) college ( ) science-economics, liberal arts, art or manual training required ( ) special courses ( ) algebra ( ) agriculture ( ) associated subjects (technical and cultural) ( ) astronomy ( ) arithmetic ( ) illustration, drawing ( ) landscaping ( ) biology ( ) bible ( ) claim adjusting ( ) costs ( ) chemistry ( ) carpentry ( ) drawing, freehand ( ) fire fighting ( ) fire prevention ( ) freight rates ( ) forestry ( ) fire fighting apparatus ( ) liberal arts, arts or manual ( ) wood, varieties and qualities ( ) zoology ( ) wild life (birds and animals) ( )

Add together all of your scores in this section and divide by the total number of subjects to get your score in this section. Then place your score at the appropriate place on the scale provided.

0 10 20 30 40 50 60 70 80 90 100

Physical: Good health ( ) vitality ( ) stamina ( ) robust physique ( ) muscular control ( ) muscular development ( ) athletic ( ) keen sense of sight ( ) keen sense of smell ( ) keen sense of hearing ( ) height [tall] ( ) strength, neck ( ) strength, back ( ) strength, arms ( ) strength, hands ( ) strength, legs ( ) critical eyesight ( ) strength ( ) considerable standing endurance during working hours ( ) considerable walking endurance during working hours ( ) ability to endure exposure to extreme weather during working hours ( )

Add together all of your scores in this section and divide by the total number of subjects to get your score in this section. Then place your score at the appropriate place on the scale provided.

0 10 20 30 40 50 60 70 80 90 100

Mental: Reserve ( ) tenacity ( ) deep thinking ( ) constructiveness ( ) creativeness ( ) originality ( ) will power ( ) farsightedness ( ) shrewdness ( ) common sense ( ) accuracy ( ) technicality ( ) sound mindedness ( ) training ( ) energy ( ) determination ( ) practicality ( ) reasonableness ( ) fearlessness ( )

Add together all of your scores in this section and divide by the total number of subjects to get your score in this section. Then place your score at the appropriate place on the scale provided.

0 10 20 30 40 50 60 70 80 90 100

Personality: Independent ( ) commanding ( ) even tempered ( ) thoughtful ( ) courteous ( ) enthusiastic ( ) sympathetic ( ) optimistic ( ) patient ( ) respectful ( ) curious ( ) industrious ( ) nature loving ( ) personable ( ) courageous ( ) sociable ( ) attentive ( ) obliging ( ) systematic ( ) punctual ( ) principled ( )

Add together all of your scores in this section and divide by the total number of subjects to get your score in this section. Then place your score at the appropriate place on the scale provided.

0 10 20 30 40 50 60 70 80 90 100

Special Complementary Abilities: Art of service ( ) art of cooking ( ) art of speaking effectively ( ) art of speaking concisely and to the point ( ) art of freehand drawing ( ) art of listening and learning ( ) art of expressing your thoughts in writing ( ) art of keen detection ( ) art of displaying ( ) art of selection ( ) carving ( ) pruning ( )

Add together all of your scores in this section and divide by the total number of subjects to get your score in this section. Then place your score at the appropriate place on the scale provided.

0 10 20 30 40 50 60 70 80 90 100

Compulsory Complementary Abilities: To endure drudgery ( ) to endure long hours of study and research ( ) endure traveling extensively and for long periods ( ) to separate essentials from details ( ) to work irregular hours ( ) execute honorable, fair judgment and supervision without sentimentality or favoritism ( ) to cope composedly with any emergency ( ) to see relationship between cause and effect ( ) to willingly follow your work wherever it calls you ( ) to supervise others ably and effectively ( )

Add together all of your scores in this section and divide by the total number of subjects to get your score in this section. Then place your score at the appropriate place on the scale provided.

0 10 20 30 40 50 60 70 80 90 100

Native Complementary Abilities: To be disciplinary ( ) to have the qualities of a leader ( ) to be creative ( ) to get to the bottom of perplexing problems ( ) to seek and find ( ) to predict weather conditions without the use of technical instruments ( ) to possess a good sense of direction (longitude and latitude) ( ) to possess the love and ability to successfully cultivate plants and flowers and vegetables ( )

Add together all of your scores in this section and divide by the total number of subjects to get your score in this section. Then place your score at the appropriate place on the scale provided.

0 10 20 30 40 50 60 70 80 90 100

Place your score for each section in the place provided:

	Score
A. Scholastic and Technical	.....
B. Physical	.....
C. Mental	.....
D. Personality Traits	.....
E. Special Complementary Abilities	.....
F. Compulsory Complementary Abilities	.....
G. Native Complementary Abilities	.....

Total Divided by Seven Equals your Rating:

This is your rating in relation to forestry as a vocation. Below seventy you should not consider forestry as a vocation; between seventy and eighty you would only be a fair or mediocre forester while between eighty and ninety the chances are that you would be a good forester; between ninety and a hundred your chances for success would be excellent.

Assembling lamps in the home-mechanics laboratory electrical unit, Chicago Public Schools

— Louis V. Newkirk

INDUSTRIAL ARTS and VOCATIONAL EDUCATION

JOHN J. METZ, Editor

INDUSTRY CO-OPERATING WITH THE SCHOOL

The Education Committee of the Screen Process Printing Association, International, has just completed a course on how to teach screen process printing. This course is available, at no charge, to schools and similar institutions by writing to Bert Zahn, chairman of the committee at the Association's headquarters, 549 W. Randolph St., Chicago 6, Ill.

Not only does this organization furnish the school with the course outline, but it also gives the names and addresses of local screen printers who will lend assistance to the instructor who is to teach the course.

This committee has really developed a well-planned course which aims to get the work started properly and to furnish the student with a background of technical and practical information which will help him later if he decides to enter industry as a screen process printer.

It may be well for teachers of printing to look into this fine offer of industry to help the school and incidentally the printing industry by working co-operatively in teaching the beginner.

LOOKING AHEAD

Now that the first semester of the school year is over, have you been able to formulate something new that might be helpful for the last semester of the school year 1953–54?

Probably you can obtain a helpful hint or two from your present students that can be adopted for the school year 1954–55.

Have you found the tests, that you have used so far this year, as helpful as you would have liked them to be? Have you succeeded in helping your students to get more out of their shop projects?

Have you interested them in designing something that they could make for one of their brothers or sisters? Have you interested one or more of them to start a home workshop? Agricultural teachers usually succeed in helping their students in selecting a project for the home farm. Students who do not live on the farm may also be induced to make something for the home, for the home garden, or for some youngster who is sick at home or in a hospital.

Have you interested any of them in building barns, hutches, and the like for different kinds of pets? Have you helped them fashion a *job of the month* calendar for the home?

Some of these questions may suggest something that may start a new trend in your shop, and establish a closer link between you and your students.

It may also point out a new way at arriving at interesting projects of your own design. If you have developed something new, either in the way of an activity or a project which interests your students, don't forget to write it up for your professional magazine so that your fellow teachers can profit from it also.

SUMMER SCHOOL — BE PREPARED

There are still several months of the school year 1953–54 ahead of us, yet it is not too early for the directors, supervisors, and instructors of industrial arts and vocational education to plan ahead for their own educational advancement.

The advertising sections of the February, March, and April, issues of INDUSTRIAL ARTS AND VOCATIONAL EDUCATION present full information about the summer-school offerings of the following institutions of teacher education:

Colorado A. and M. College, Fort Collins, Colo.

New York University, Washington Square, New York 3, N. Y.

Oregon State College, Department C, Corvallis, Ore.

Oswego State Teachers College, Oswego, N. Y.

Pennsylvania State University, State College, Pa.

Stout Institute, Menomonie, Wis.

University of Minnesota, Minneapolis, Minn.

Utah State Agricultural College, Logan, Utah

Wayne University, Detroit 2, Mich.

Scanning that list of teacher education institutions shows that the proper choice will offer opportunities for summer sessions of various lengths, courses of many kinds, unlimited recreational facilities, and excellent chances for visiting scenic and historic spots.

ANOTHER SAFETY KINK

We are all accustomed to get into our automobile, fiddle around in one or more pockets until we have found our auto keys and then only can we switch on the motor and start off for our chosen destination.

That switch mechanism is really a safety device — safety against theft, safety against unauthorized use, and the like. Of course, this type of switch mechanism was soon found to be a necessity, that is why we find it on almost all automobiles.

But the same type of switch mechanism could have been put on power machinery for years, but most likely that was not thought of. Of course, in industrial shops and school shops, we have switch boxes that can be locked so that the switch itself cannot be tampered with. But even there individual switch locks would prove helpful as safety devices.

In the home shop such locks would be still more useful because young children, and even teen agers, are likely to meddle with the ordinary switches found on electrically operated woodworking machinery to their own detriment or the danger of wrecking a favorite bit of machinery.

It is welcome then to read that the DeWalt Power Shop is now being provided with a Safety-Lock Switch, and it is to be hoped that the practice which this firm has introduced will quickly be adopted by many other machinery firms.

Of course, many home shop owners of electrically driven power machines have had their own methods of making their equipment inoperative when they are not using it themselves, but most of these schemes are cumbersome and are often dependent upon human decisions which are frequently not acted upon.

Here is hoping that safety switches of this kind will be found more often on power machinery in the home shop, school shop, and industrial shop.

Training Girl Linotype Operators for the School Print Shop

GARY G. GORE
The Stout Institute
Menomonie, Wis.

More and more high school and college printing shops are being faced with the problem of training and keeping satisfactory linotype operators. Part-time jobs are plentiful for high school boys, and finding a boy willing to spend his time learning to operate a linotype and then setting type at comparatively low school pay rates is an ever growing problem to shop instructors. Likewise, many college instructors have trained male students as linotype operators, only to have them taken out of the shop just when they were beginning to produce.

Perhaps an innovation introduced at The Stout Institute, a Wisconsin State College specializing in preparing teachers of industrial education and home economics, has a solution which may be an answer to the question. That solution is training girls for linotype operation.

After two years of experimentation, The Stout Institute reports that it is thoroughly satisfied with its feminine linotype operators.

To achieve those results, a simple three-part training program has been developed. It consists in: (1) basic printing operations; (2) the linotype keyboard; (3) linotype care and maintenance.

Lloyd Whydotski, chairman of the printing department at The Stout Institute, has found that the average girl's first reaction to a printing shop is one of doubt.

For a time, she stares at the unfamiliar

Fig. 1. (Left) The girl training to become a linotype operator will need such basic composition fundamentals as line justification, spacing, and proof marking. Handsetting type will help her acquire this knowledge. Fig. 3. (Right) Girl linotype operators can easily become proficient in routine adjustments and maintenance of machines

surroundings, does not understand trade terms, and worries about the ink she sees in the shop. However, she soon becomes curious about the work and willing to do things as directed. As soon as she discovers that ink can't get through her apron and can be washed from her hands, she takes a healthy interest in shop activities and quickly becomes adjusted to her surroundings. Then her actual training begins.

First, she is taught to set type by hand, Figure 1. This teaches her the importance of line justification, proper spacing, and proof marking. She learns the different sizes of type and some of their names. She is also taught the point system of measurement at this time, a matter of great importance to her later in actual linotype operation.

Fig. 2. Actual practice at the linotype keyboard is essential to speed and accuracy in the linotype operator. Girls have the patience and manual dexterity needed to make good operators

After a girl learns the fundamentals of type setting, she is taught to lock up a form and set it up on a platen press. It is not necessary for her to become expert at any of these operations, but she should learn how ink is transferred to paper.

As the second step in the three-part training program, the girl in training is taught the linotype keyboard, Figure 2. She learns the position of the characters on the keyboard by the use of charts and fingering exercises on the machine. She is also taught how the machine accomplishes the work which she, in hand setting type, was doing by hand. From this point on, she practices setting straight copy until she is well along with her finger movements. This training, which usually requires only several months, can be put to good use if she sets copy for the school paper or similar work.

Finally, the girl is taught the simpler adjustments, care, and maintenance of the linotype, Figure 3. This is a continual process which takes place through individual instruction and the use of books on the subject. It is perhaps the most difficult part to teach, but special pains should be taken to teach it thoroughly.

When the girl reaches her junior year in high school or college, another should begin preparation to take her place. Thus a shop will not lack an operator when an older girl is graduated. The process is a continuous one, lasting as long as the need demands, and providing the shop with a smooth flow of competent, interested, reliable linotype operators.

A word of advice is in order at this point: use discretion when choosing a girl to be trained. A serious-minded girl will take a real interest in her job, whereas a flighty girl tends to lose interest or become discouraged at her first challenge. Of course, the linotype work — with its responsibilities and its rewards — should be fully explained to any girl before she accepts the job. Adherence to these precautions will determine the success or failure of the training program.

This system of training girls for linotype work serves another purpose. It permits using available advanced printing students in other areas of the shop, such as the pressroom, where girls do not ordinarily work.

The Stout Institute's experience shows that girls can do linotype work as well as can boys, and they frequently have a job stability that is lacking in many boys and young men.

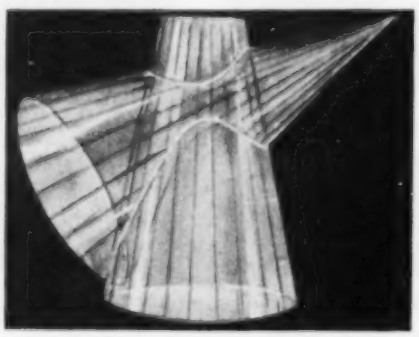
PROBLEMS AND PROJECTS

VISUAL AID FOR THE DRAFTING ROOM

CHESTER E. ERICKSON
Senior High School
Springfield, Mo.

Most drawing teachers have experienced the difficulty encountered by many beginning students in visualizing problems of intersection. Transparent celluloid models made from discarded X-ray film will help solve this difficulty. These models may be made quite inexpensively by soliciting used X-ray film from hospitals and doctors' offices.

To prepare this film for use, it is necessary to soak it for one hour in a solution of lye water. This softens the emulsion, which may then be scraped off, leaving the celluloid transparent.



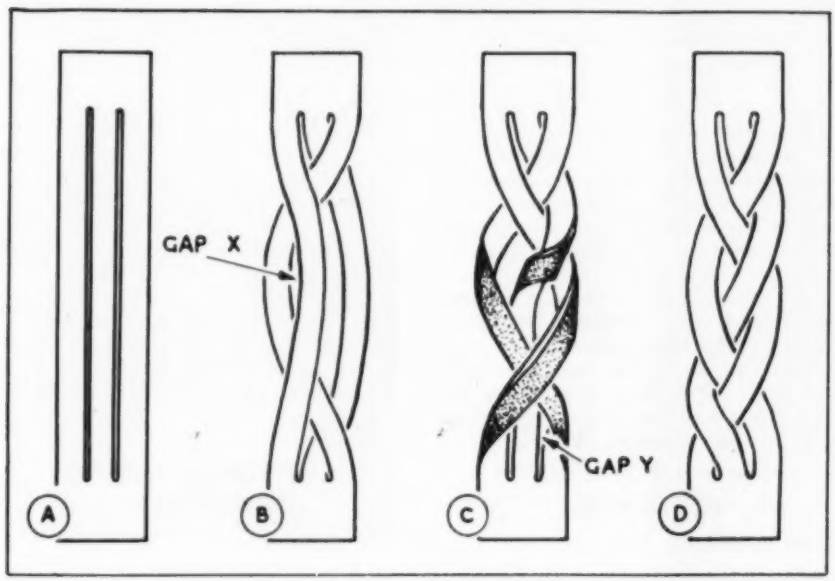
Visual aid for teaching intersections

Then fasten the celluloid over the pencil pattern and trace it in ink. Next, cut out the celluloid pattern very carefully, and shape it as needed. Fasten the edges together temporarily with cellulose tape, and then cement them together permanently with airplane glue.

ENDLESS LEATHER BRAIDING

PERCY W. BLANDFORD
Stratford-on-Avon, England

The method of braiding shown in the illustration may be used to make a belt or scarf ring, or it may be incorporated in some other piece of leatherwork. The achieving of the apparently impossible is very satisfying, and will mystify anyone examining the piece.



Endless 3-strand braiding

Use limp and pliable leather. Cut it into three equal strips, about ¼ in. wide, but with closed ends, as shown at *A*. The strip may be any length, and a sufficient piece should be left at the ends to take snap fasteners, buckles, or other fittings. As you work, the top has to be worked as an ordinary three-strand-braid, while at the bottom the resulting mix-up has to be kept untangled.

Start by taking the right-hand strand over the center strand, then the left over the right. See at *B*. Hold the top plait in position, and push the bottom end completely through gap *X*. Pull the work out straight, with the bottom part right side forward as shown at *C*.

Push the bottom end through gap *Y* and all of the parts should untwist and lay flat as at *D*. Notice that each outside strand goes to the opposite side and back again, while the center strand goes to each side and finishes in the middle. This is a complete set of actions, which may be repeated as often as necessary to make up the length required.

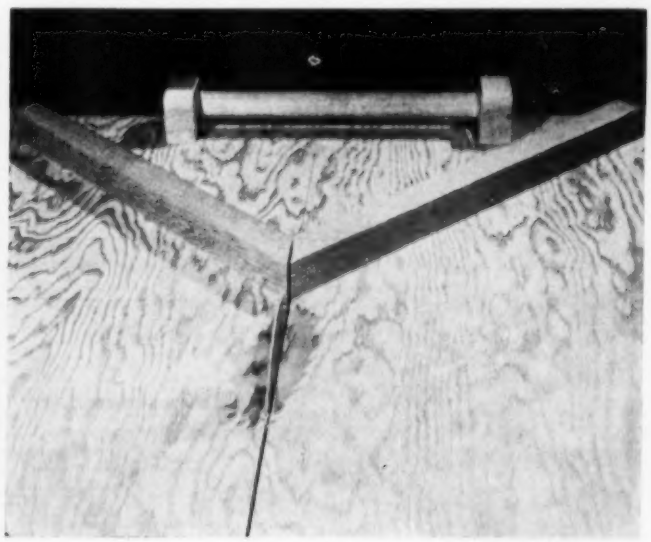
A MITERING BOARD

E. D. MEYER
Associate Professor
Industrial Engineering Department
Oregon State College
Corvallis, Ore.

In a woodworking shop it is frequently necessary to cut the ends of various shapes of molding, casings, and other wood members at a 45-deg. angle. These cuts may be made in a miter box, with several hand tools, the trimmer, or on the table saw. The device described in this article was observed in use in the woodshop of the Coquille High School, Coquille, Ore., where Paul Snider is the teacher in charge. A similar device is in use in the woodshop at Oregon State College, Corvallis, where it has proved to be of great value as a means of saving time and producing excellent miter joints in stock of many shapes and dimensions. Because of its simple and inexpensive construction it is a piece of equipment which should be available at every table saw.

The principal item in the construction of this device is a base made from a piece of ½-in. thickness fir plywood. Its width and length would vary with the size of the saw table. The saw table shown in Figure 1 is 52

Fig. 1



— Jim Hosmer Photos

Fig. 3

Fig. 2

in. wide and 32½ in. long, including the extensions. The ½-in. plywood was cut 40 in. wide and 50 in. long. This provides ample width to support long pieces which are to be mitered and the length is sufficient to allow a wide piece of material to be placed in front of the saw blade. If approximately the above proportions are maintained the size will be suitable.

Two hardwood strips are made to fit into the table grooves where the cutoff and miter gauges normally travel. These strips should be made from straight grained hardwood and should be fitted to run in the grooves without binding or excessive friction. Two pieces of wood about 1¾ by 1¾ by 24 in. are used for the fixed miter guides, as shown in Figure 2. It is advisable to straighten and square these pieces so that any molding to be cut will fit the angle between them and the plywood base and can be firmly held along their length. A handle may or may not be desired. It can be made from a 1¾ by 3-in. piece of stock which would extend along the entire width of the plywood base, or a handle similar to the one shown in Figure 3 may be constructed. The main purpose of the 1¾ by 3-in. piece would be to brace the plywood and to eliminate any tendency for it to warp.

To assemble the pieces, lay out center lines the entire length of both faces of the base. Lay out the approximate location of the hardwood guide strips and the two miter guides. With a hand drill make holes through the plywood for screws to fasten the four guides referred to above. Lower the saw blade below the level of the saw table and place the two table guide strips in the table grooves. Place the base over them and drive the screws. Carefully place and temporarily fasten the two 45-deg. miter guides. It is suggested that not more than one screw be driven into each of the 45-deg. guides prior to testing for accuracy of location. Fasten the handle or cross brace in place.

Rub paraffin wax on the table guides and in the table grooves. Place the plywood base on the saw table with the guides in the table grooves. Push the device back and forth a number of times to work it into position. Start the saw motor and raise the saw blade so that it cuts through the plywood and extends well above it. Make sample cuts from each side of the 45-deg. guides. Carefully check the angle of each as individual cuts and the combined angle when two opposite angles are brought together. Make the necessary readjustments of the 45-deg. guides by tapping them one way or the other and when properly adjusted drive the remaining screws. See Figure 3.

This jig can be made to serve a larger range of work by the addition of adjustments and stops. The miter gauges can be made adjustable to the various angles commonly used. They can be made with *T* slots into which sliding stops can be fitted when several pieces of equal length are required.

FLY CUTTER

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New York State College for Teachers
Buffalo, N. Y.

This fly cutter has been found useful in the wood, metal, and electric shops. It was originally made for the purpose of cutting out of plywood, many small wooden wheels with a ¼-in. hole in the center. It has since been used for cutting large holes in aluminum, steel, copper, brass, plastics, fiber, and other materials. This project lends itself nicely to beginning toolmakers in learning the operation of a lathe, with a little milling machine work. The ¼-in. square hole will give some good filing practice or it may be broached. The ¼-in. pilot may be made removable for other size pilots if necessary. The cutter is a piece of ¼-in. high speed tool bit, as used in the lathe, and ground to suit the requirements of the job.

For making wheels, a ¼-in. hole was drilled through the plywood (plastic, etc.), and the tool bit ground so that a radius would be formed on the disk when the cutter was one-half way through the material. Then the material is turned over and the wheel is cut through from the other side, resulting in a very nice wheel.

In cutting holes in plywood for such projects as serving trays, to accommodate glasses, the tool bit is ground with the radius cutting the material instead of the disk. This makes a very neat job requiring only light sanding to complete the job.

One important point in the use of this fly cutter is the adjustment of the cutter. The cutting end of the cutter should be adjusted so that the pilot is engaged within the pilot hole for at least one eighth of an inch before the cutter begins to cut. The cutter arm and the tool bit cutter are held securely with Allen type setscrews.

JIG FOR GRINDING JOINTER KNIVES

J. L. CERMAK
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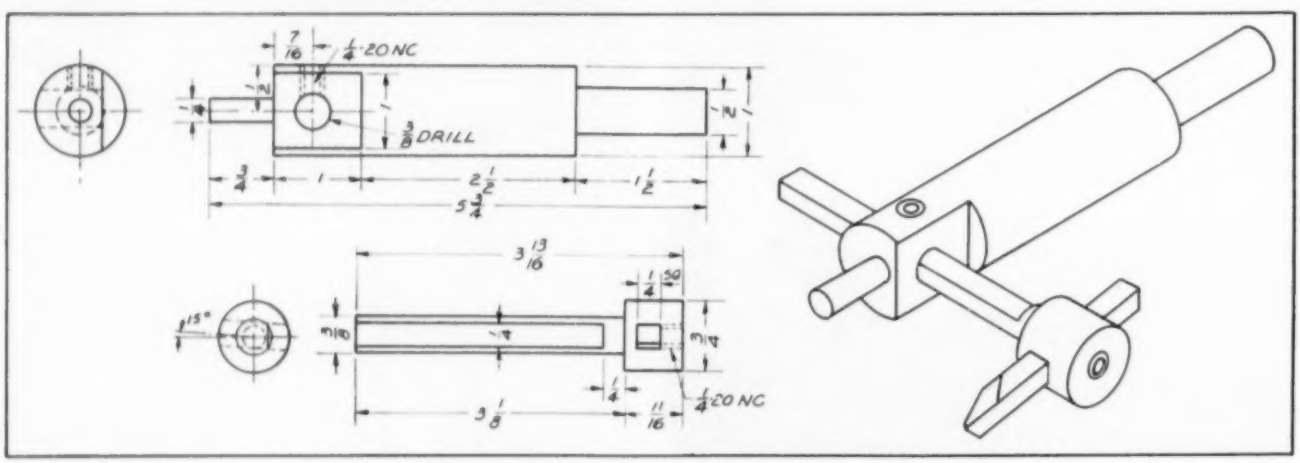
Southwestern State College
Weatherford, Okla.

Many of the industrial-arts departments in high schools do not have a good method of grinding jointer knives. Quite a number of instructors in our area send jointer knives to our college for grinding. This has resulted in the development of the simple jig shown here. It is designed to be used with a drill press. This jig can be easily made in any industrial-arts shop. It is particularly suitable for jointer knives up to eight inches in length.

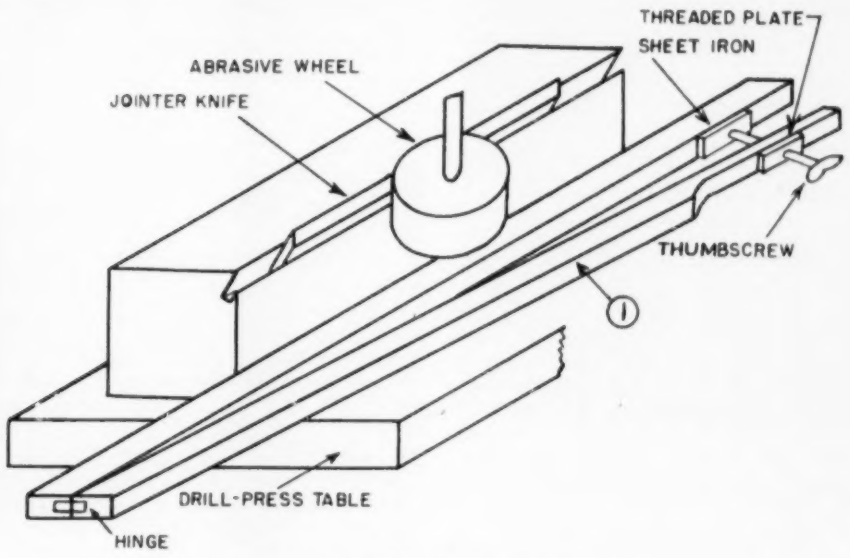
Dimensions are not given on the drawing since it is not necessary to adhere to any specific dimensions.

The piece labeled number one is attached to the drill press table with two bolts. The thumbscrew gives an accurate adjustment for depth of cut of the abrasive wheel. An abrasive wheel of the cup type about 2½ in. in diameter and 1½-in. face is well suited. The groove in the block which holds the jointer knives can be made easily on any circular



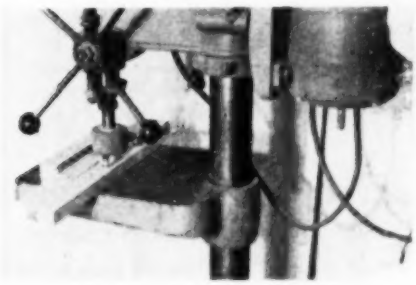
Detailed drawing of the fly cutter by John Fontana

Grinding the jointer knife



Jig for grinding jointer knives

saw at the desired angle. Some may find objection to this jig for the fact that only a small portion of the face of the abrasive wheel does the cutting. This may be overcome by planing off the face which rests on the drill press table so that one end of the jointer knife is higher than the other in reference to the drill-press table. By planing the proper angle the whole face of the abrasive wheel can be used. If this is done the face of the abrasive wheel must be true and perpendicular to the drill-press table in order to do a perfect job of grinding.



Grinding the jointer knife

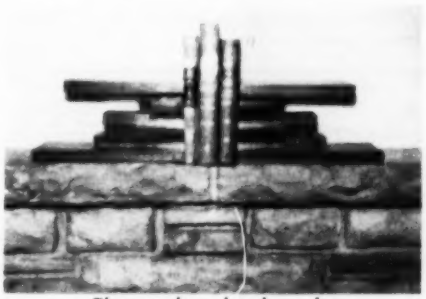
MODERN BOOK ENDS

HOMER A. MATTSON

Minneapolis, Minn.

This project is designed with the idea that students can be encouraged to do some original thinking about a problem in the shop. In this case the project is used as an example of what can be done to deviate from the customary book end. A second motive, ulterior though it may be, is to find a use for the odds and ends of scrap wood that accumulates from an assortment of end tables, coffee tables, bookshelves, and the like that are made during a woodworking course.

I started one of these book ends during the early part of the school year and left it around the shop while it was being made. Its unusual appearance caused a good deal of curiosity among the students and before long several of them wanted to try something like it. It served well as a filler project when their main project was completed or nearing completion.

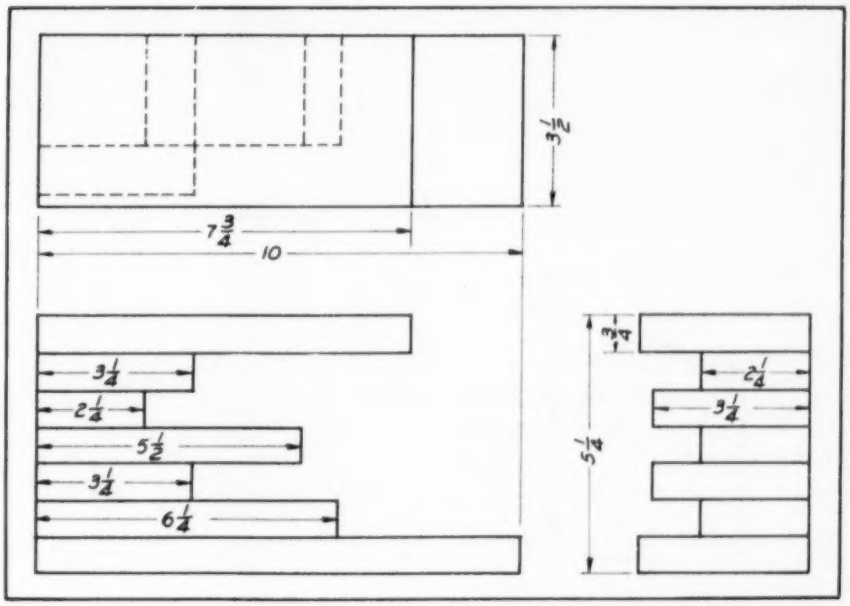


The modern book ends

Some of the advantages are its low cost, its stress on the fundamental process in squaring stock (this takes it out of the realm of just an exercise), and its possibility as a gift that is different.

There are many variations of the project. Some turned them into lamps, others made a place for ash trays along the base and others simply varied the style. The wood and finishing may be chosen to match some piece of furniture in the home.

Care must be taken in preparing each piece so that a good glue joint can be made. It is



Modern book ends

very important to remember that when assembling the two units, the assembly must be reversed so that the pair will work together as book ends.

BACKYARD CHICKEN COOP

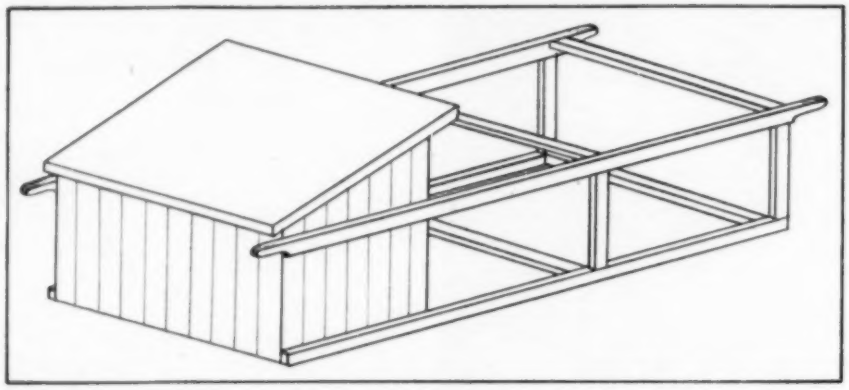
HAROLD O. AKESON

High School

East Orange, N. J.

Raising poultry on a small scale in the back yard, or lot, is a very interesting hobby and keeps the table supplied with fresh eggs. It has other good points. The chickens, or hens, also solve the problem of disposing of most of the kitchen leavings, especially in the summer from the many green vegetables, fruits, lawn cuttings, weeds, and the like that are valuable contributions. Another worthwhile factor is the fertilizer obtained that will be good for the garden.

A house of the type and size illustrated, is sufficient to care for a few hens. If more than just a few are wanted the size of the house and enclosure would have to be enlarged in proper ratio from the present plans when building. It is also ideal for housing small chickens as it is easily moved by the handles on each end from one location to another. It is so constructed that the roof, the back edge

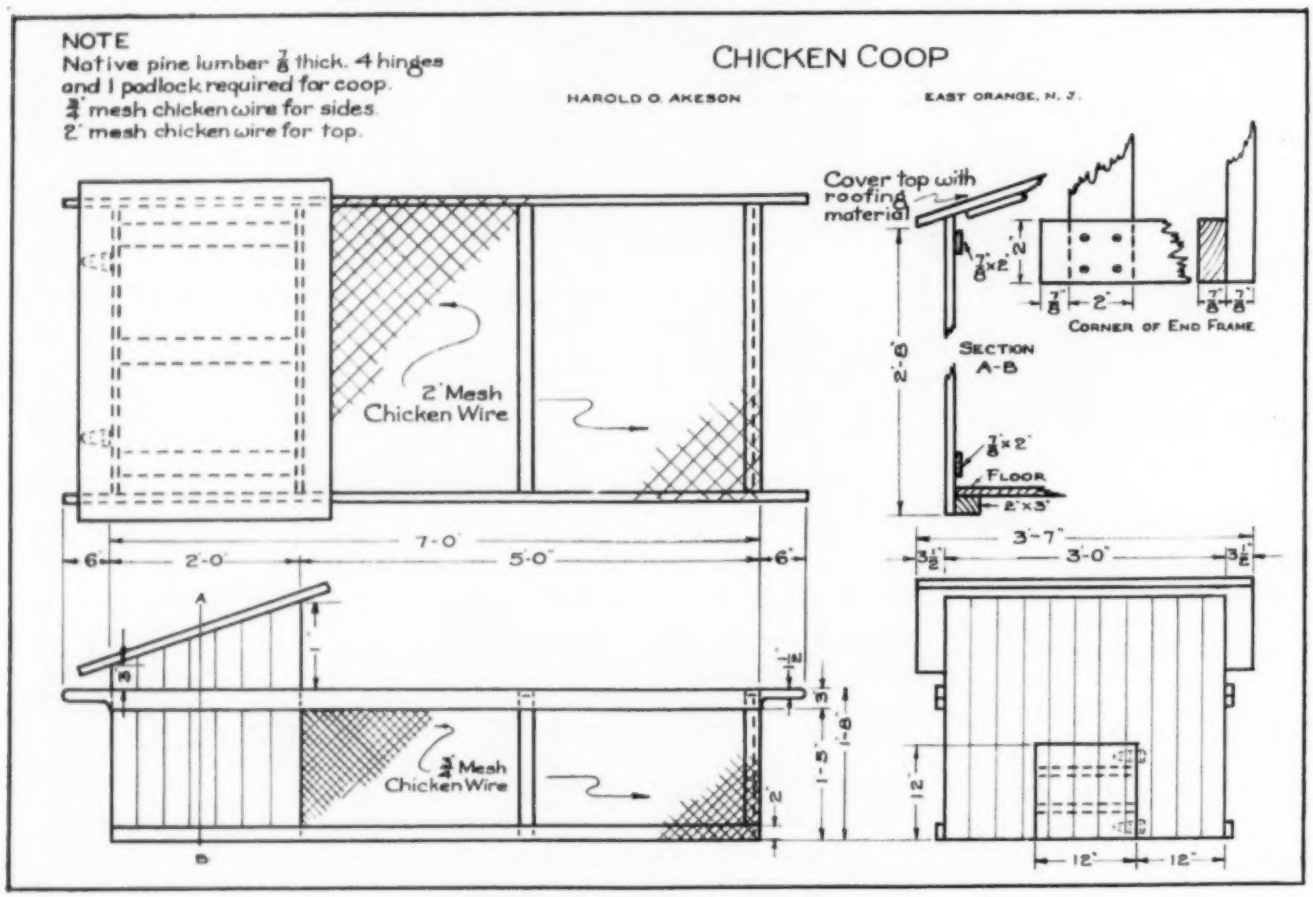


The chicken coop

of which is hinged, can be opened for cleaning, white washing, and removing the eggs and may be adjusted at the top for ventilation. Outside of the stock used for the run and a few other items, plywood or novelty siding could be used in the construction.

The two sides, 2 ft. by 2 ft. 8 in., are made of either ¾ or ⅞-in. native pine. These pieces are tapered from 2 ft. 8 in., at the front to 1 ft. 9 in., at the back. The front is 2 ft. 8 in., by 3 ft. If novelty siding is used instead of plywood — running vertically — a supporting frame should be used, made of ⅞ by 2-in. stock. Use either nails or screws to fasten the various pieces together. An opening must be provided in the front wall to serve as an entrance.

A floor 2 ft. 10½ in., by 1 ft. 10½ in., can be made of ¾-in. match flooring of suitable width or a piece of ¾-in. fir plywood. This is fitted into place on the 2 by 3-in. frame pieces which keep the house square while working on other details. The floor boards are held together by two battens, ¾ by 3 in. by 2 ft. 9 in., and fastened on the underside of the boards. Plan these battens so they are



Chicken coop by Harold O. Akeson

inside the frame area which holds the floor, and fasten them to the flooring with No. 10 by 1¼-in. f.h. screws.

The next step in construction would be installing the nests. These may be supported on a shelf ¾ in. thick by 12 in. wide and 2 ft. 10½ in. long. This shelf forms the bottom of the nesting boxes. It rests on two cleats, ¾ by 1 in., by 1 ft. 10½ in., and is located 10 in. above the floor on the side walls. It should be removable for cleaning and white washing. A strip of ¾ by 3¾ in. by 2 ft. 10½ in. long is fastened to the front edge of the shelf. The partitions are fastened to the shelf with 8*d*. nails driven up through the shelf and into the ends of the partition. For this size house, two nesting boxes, one in each corner would be satisfactory.

The roosts are made of 1½ by 2-in. stock, 2 ft. 10½ in. long. They are placed about 10 in. from the front of the house and extend from one side to the other side. Height from the floor 20 in.

The door is made of the same material as the sides of the house. It may be hinged to the front or slide in two rabbeted pieces made of 1½-in. square stock. A wide rabbet, ⅞ by ⅞ in., for a slide would give very free movement for the door. A flexible wire may be used to raise or lower the door from the inside. If it is on hinges, a latch on the inside is advisable to control the opening and closing of the door from the top of the house.

Before the house is set in place several coats of good outside paint should be applied.

To complete the job make a frame for the run and cover with wire as shown. Added length is to be allowed on the two top pieces of the frame for hand grips for moving the coop from one location to another.

If the size of the house is increased for a larger flock of hens it would be necessary to increase all the facilities such as the number of nesting boxes, roosts, and the like.

PORTABLE PROJECTOR STAND

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Georgia Teachers College
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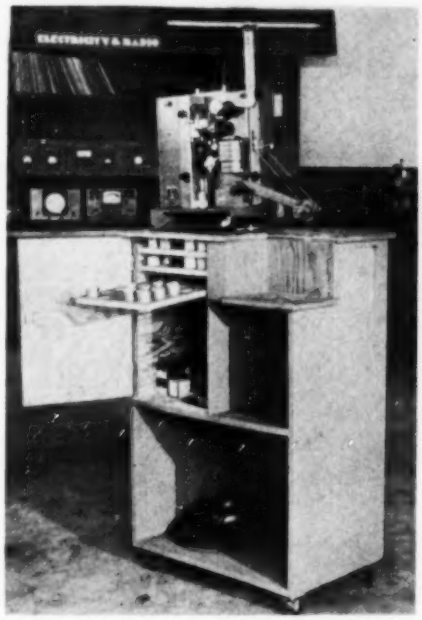
The accompanying illustrations show a portable projector stand that has proved quite practical. In addition to making the projectors convenient to use, their life is materially increased due to the elimination of the wear and tear usually resulting from moving them about in the conventional manner.

The projector stand is made of ¾-in. plywood and mounted on rubber wheel casters. The top is large enough that no portion of either projector extends beyond it, and the recessed portion accommodates film reels up to the 1600-ft. size. The height of the stand permits projection of pictures over the heads of persons seated in front. The cabinet is used for the storage of strip films, slides, spare projector lamps, etc. Plastic covers protect each projector from dust when not in use.

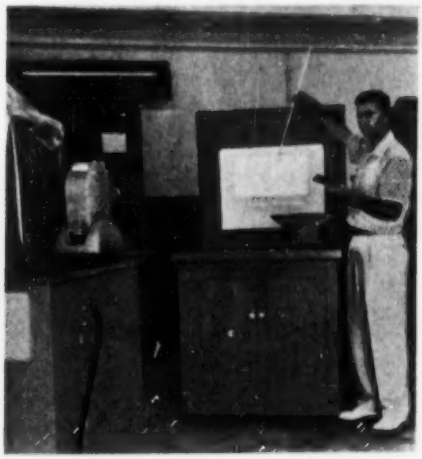


RCA Junior 16mm. sound projector mounted on portable projection stand. Loud speaker is mounted in cabinet front. Strip film cans are stored in shelves

Two machine screws, extending through the top, replace the screws that formerly held the rubber feet on the elevating assembly and hold each projector in place. The rubber feet at the rear of each projector rest in shallow holes to help keep the projectors in position and to permit them to be elevated freely.

The two power cords are plugged into a duplex receptacle within the cabinet. Only the one power cord connected to the receptacle and coiled on the outside of the cabinet when not in use need be handled to place either projector in operation. The loud-speaker is also mounted in the cabinet thus eliminating the necessity for handling it or its power cords. (The fact that the sound comes from behind the observer in the average size classroom has not been reported objectionable.)

SVE slide and strip film projector shown mounted beside RCA Junior 16mm. projector. Power cord supplies power for both projectors



Portable projection stand in use with portable demonstration bench. Operations may be demonstrated and details shown by means of slides or strip films

Strip films are stored in the cabinet for convenience. The three shelves contain 96 holes, bored to hold the strip film cans snugly and thus making it necessary to remove the film from the can while it is held in the shelf. If the hole is large enough that the film container may be removed from the shelf it will seldom be returned to its proper place.

This equipment ideally serves the needs of individual students and small groups who wish to view material presented in films and at the same time must remain under the shop teacher's supervision. The projector stand is merely rolled to a convenient place in the shop and the film is projected on the wall, a sheet of paper, or any other suitable surface with little or no inconvenience to the remainder of the class. In combination with a portable demonstration bench it is possible for the teacher to present demonstrations and at the same time utilize films that might help to clarify details.

COFFEE WARMER

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This coffee warmer, Figure 1, is useful as well as decorative. It will keep coffee or tea warm on the dining table during a leisurely dinner and also serve as an interesting decoration in a breakfront or a hutch cabinet. A combination of highly polished brass and

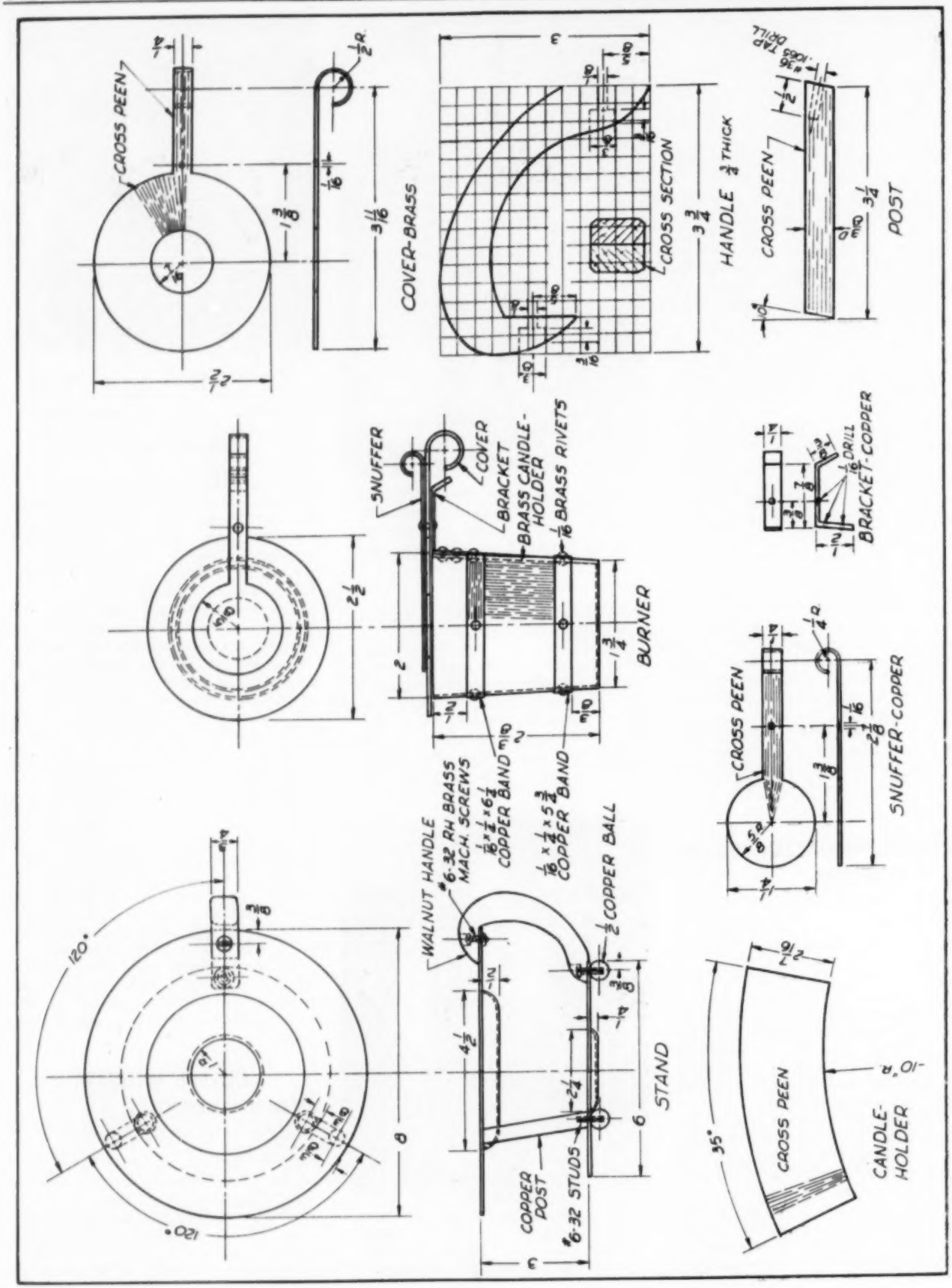

Fig. 2. Assembly and details of coffee warmer

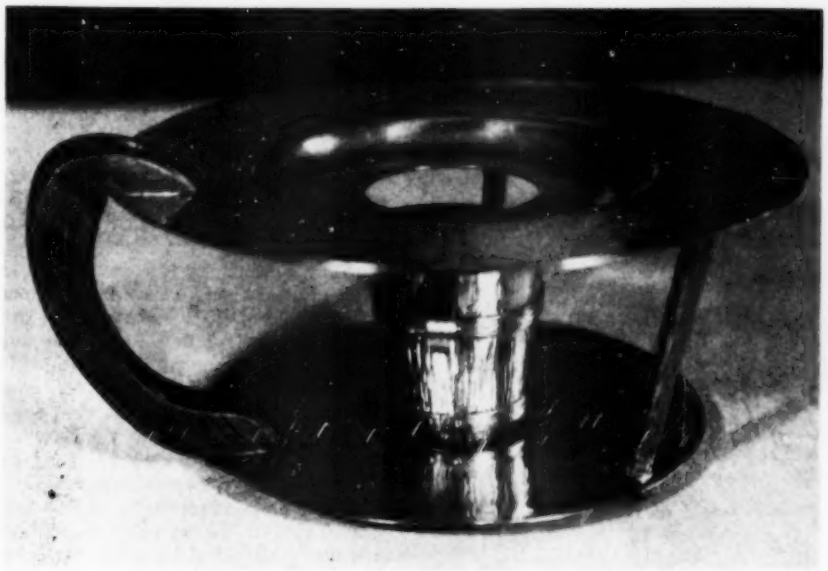

Fig. 1. Coffee warmer

copper gives the warmer a lively appearance.

The large 8-in. tray which holds the glass coffeemaker and the smaller 6-in. tray which holds the candle burner are made of copper. The copper disks are planished with a broad face hammer and then shaped in appropriate molds. The 2-in. hole in the 8-in. tray is cut after the tray is formed. The two $\frac{3}{8}$-in. copper posts are cross-peened. The ends of these posts are cut at an angle as shown in Figure 2. One end is drilled and tapped for a 6–32 stud. The other end is soldered to the 8-in. tray.

The handle is made of two $\frac{3}{8}$-in. thick pieces of walnut laminated for strength.

The burner is made of brass and copper. The candleholder is made of brass. All the parts except the bottom are cross-peened before they are formed. The candleholder can be shaped around a wood mandrel. The seam and bottom are soldered and then the copper bands are riveted on.

It is suggested that most of the metal components be cleaned and polished before assembling. The handle is lacquered. The holder is designed to hold a regular candle refill as sold for coffee warmers by the department stores.

This project may well be recommended to senior high school students who have had some experience in metalwork.

THE LAW AND THE MOTORIST

One does not have the absolute right of way even though the intersection is protected by a stop sign, according to a recent case decided upon by the Illinois Appellate Court. In this case, a car being driven on a through highway struck another car being driven across the highway after having stopped at the intersection. The only witness to the collision stated that car number two had stopped at the *Stop* sign for 15–30 seconds and then started to cross the intersection at three miles per hour, no other car being visible. Car number one came over the crown of the hill at a high speed and crashed into the second vehicle. The Appellate Court, reversing the lower court said: ". . . the right of way is not an absolute right and cannot be asserted regardless of distance and speed." You will want to impress your students that they should be always on the alert for vehicles likely to enter their traffic lane from side roads. — *"News for Driving Instruction," AAA, Washington, D. C.*

CONSTRUCTION OF A SOLVENT TANK

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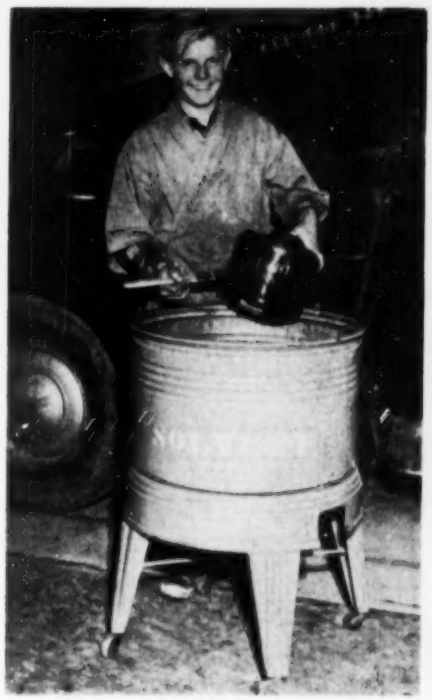
Fall River Joint Unified High School
McArthur, Calif.

The washing of auto parts in the automechanics shop generally requires that a solvent tank be bought or constructed. A solvent tank which is easy to clean, convenient to use and move, and which in addition has considerable *eye appeal* can be constructed from a discarded washing machine.

1. Secure a discarded washing machine from an appliance store or junk yard.
2. Remove all controls, wringers, impellers, etc.
3. Weld or otherwise repair any holes in the tank of the machine.
4. Fasten a faucet to the pump outlet as a means of conveniently draining the tank.
5. Fasten all legs and braces securely to the tank.
6. Oil the castors.
7. Fasten a convenient handle to the tank.



Discarded washing machine transformed into a solvent tank

8. Sand and prepare the surface for painting, then paint the tank with a good grade of enamel to harmonize with your shop's color scheme.
9. Label the tank and put it into operation, replacing the gasket around the lid if necessary.

HAMBURGER PATTY MAKER

HOMER MONEY
Denton, Tex.

This is a project that will be found very handy in outdoor cookery.

The hamburger patty maker will form a patty $4\frac{5}{16}$ in. in diameter by $\frac{1}{4}$ in. thick.

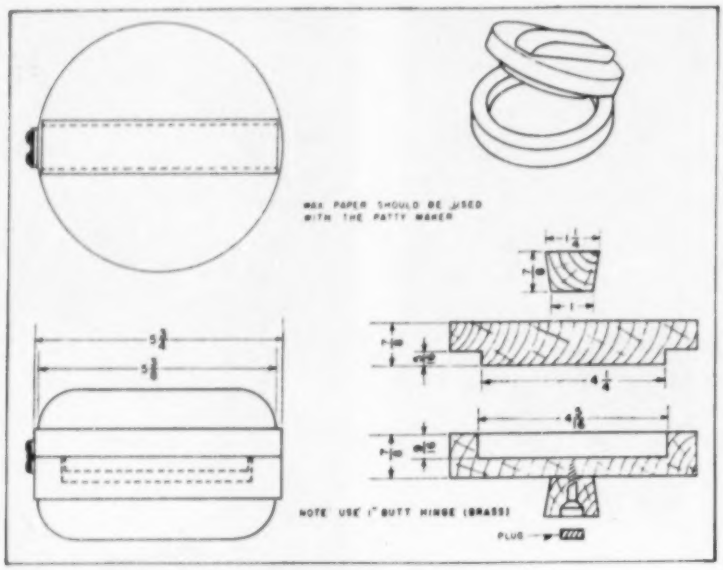
It will also be handy in the kitchen for forming many kinds of patties.

Procedure for Making Patty Maker

1. Any hardwood is suitable for the patty maker project since wax paper is used to separate the patty mold and meat for cleanliness.
2. Two pieces of 1-in. hardwood are cut to $6\frac{1}{2}$ in. square. Diagonals are then drawn to locate the center of the boards.
3. A softwood block (pine or fir) $2\frac{1}{2}$ in. square and 1 in. thick is then cut to size. Locate center same as above.

NOTE: The smaller block is mounted on the larger block so that the screws through the small faceplate will not penetrate the patty maker.

4. A piece of newspaper or blotter is torn or cut to be placed between the large block and the small block.



Hamburger patty maker

5. Glue (liquid animal) is then spread on the large block; the paper is placed on the large block, and more glue is applied to the other side of the paper. Additional glue is applied to the smaller block. The small and large blocks are then clamped together. Precaution should be taken to place the small block in the exact center of the large block.

6. The small block is then mounted on the faceplate for turning.

7. The large square block should be marked with a compass to the approximately finished circumference, and then sawed on the band saw to facilitate easier turning.

8. Beginners should use the round nose lathe tool to turn the edge grain, while a 1¼- to 1½-in. skew chisel is used for squaring the face.

9. The inside diameter is marked on the face of the round disk, then a parting tool should be used to cut the outer portion to desired depth.

10. The large center portion of the material is removed roughly with the round nose tool while the finish part is done by scraping with a skew chisel.

11. Sanding is done while the parts are still on the lathe.

12. The plug part of the patty maker is turned 1/16 in. smaller than the recessed part to allow for the use of wax paper.

13. After the two parts have been completed, a wood chisel is then used to separate half of the patty maker from the block used for attaching it to the faceplate.

14. The handles are made from 1-in. stock of any suitable hardwood.

15. The two pieces are placed together and a space is flattened on one side to accommodate a 1-in. brass butt hinge using ½- or ⅝-in. round head screws.

16. A tasteless, odorless, neutral finish should be used, such as hot paraffin or olive oil.

MEASURING IMPEDANCE WITHOUT STANDARDS OF CAPACITY AND INDUCTANCE

NORMAN R. DILLEY

Monrovia, Calif.

The circuit setup presents a practical and fairly simple method of measuring inductance or capacity as used in power and audio circuits. It is not as direct as the various bridge methods where capacity and inductance standards are a necessity. However, for the shop where these standards are not available this method is an alternative.

An ohmmeter and an a.c. voltmeter (a vacuum tube voltmeter is highly desirable) are needed, besides the circuits described below.

The accuracy of the measurements will be determined by the accuracy of the resistance readings. Typical results should show less than 3 to 5 per cent error.

The actual construction necessary involves a power supply, an audio oscillator of simple yet stable design, and the resistance-impedance balancing circuit.

The resistance-impedance circuit is basically an old laboratory circuit for measuring impedance first mentioned by Dowling. Figure No. 1 shows the circuit with the double pole double throw switch and is the circuit to be constructed. The double throw switch enables the voltage drop across the resistance to be compared with the voltage drop across the impedance. The a.c. input from the oscillator remains constant as in either position of the DPDT switch this a.c. input oscillator voltage goes through both the resistance and the inductance before going to ground. In other words, the load on the audio oscillator output transformer, while it varies with the setting of the adjustable resistors, always includes the inductance or capacitance and the resistance.

Now the operation of the circuit is rather difficult to see with the DPDT switch included. If the switch is thrown to measure the voltage drop across the impedance a real simple circuit is actually involved. Figure 2 is the actual circuit that allows a reading to be taken across the impedance. The oscillator input from the insulated jack goes through the resistance and the impedance and then to ground. The voltmeter is connected between the high side of the impedance and the ground.

Now if the DPDT switch is thrown to measure the voltage drop across the resistances a similar circuit results. Figure 3 is the actual circuit. As can be noted the ground has been shifted to a point between the input and the resistance. The voltmeter must be disconnected from the circuit at the same time for proper comparison between the two voltage readings otherwise a SPDT switch could be used. In Figure 3 the voltmeter measures the voltage from ground to the high side of the resistances.

When the adjustable resistance is turned until the voltage readings across the impedance and the resistance are equal, then one knows that the value of the impedance in ohms is equal to the value to the resistance in the circuit in ohms. This is simply the ohms reading across the two adjustable resistances. The more accurately this value is ascertained the more accurately will the value of the inductance or capacitance be ascertained. If one desires extreme accuracy then a resistance bridge can be used. If ordinary 5 to 10 per cent error can be tolerated, then the shop ohmmeter may be used to measure the value of the resistance.

When an inductance is being measured one must detach the inductance from the impedance-resistance balancing circuit and measure its d.c. resistance. This value and the value of the reading across the two adjustable resistances is used in the following formula for the inductance:

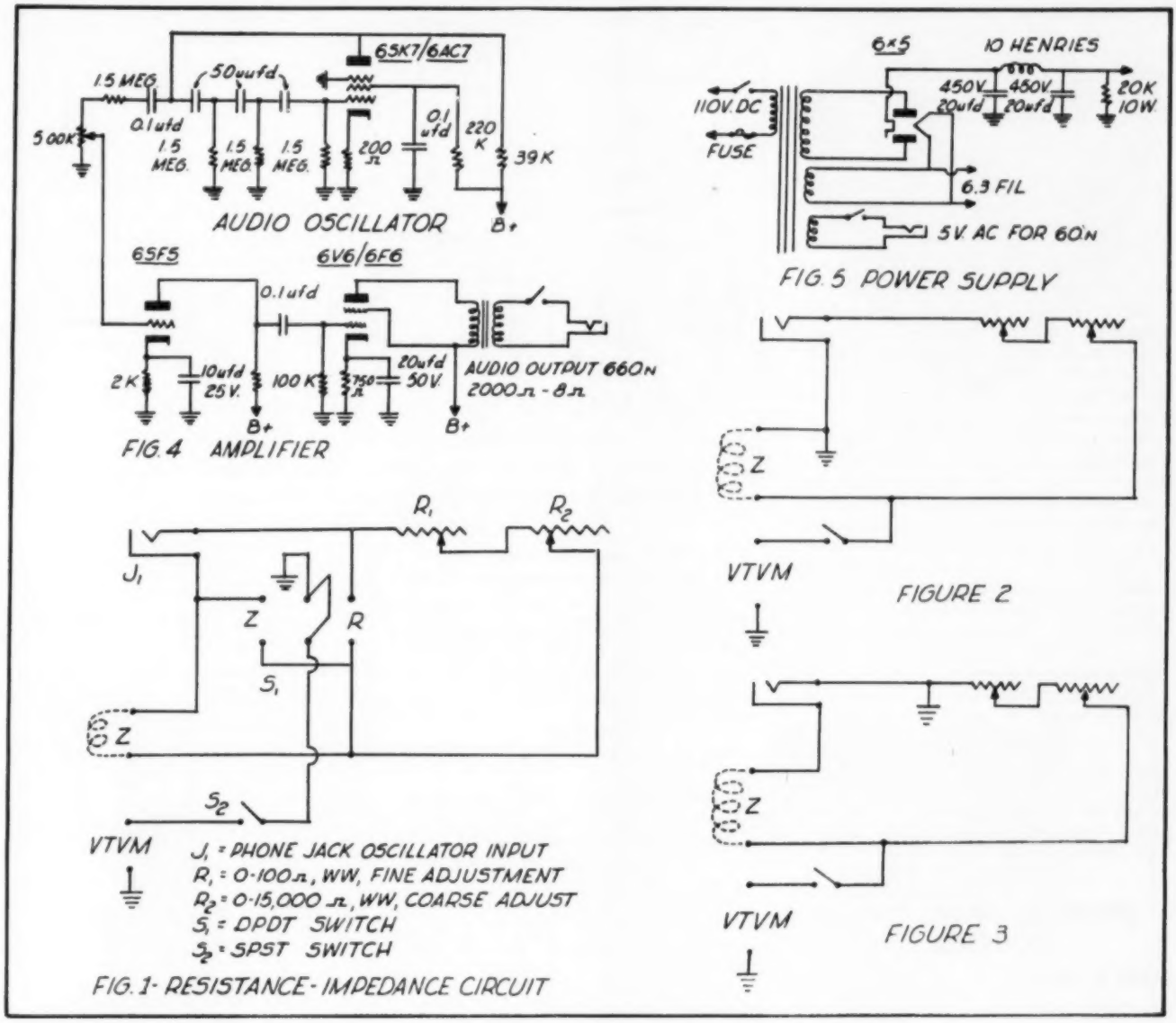
$$L = \frac{\sqrt{Z^2 - R^2}}{2\pi f} \text{ henrys}$$

where L equals the inductance
Z equals the ohms across the two adjustable resistances
R equals the d.c. resistance of the inductance
f equals the frequency of the a.c. input in cycles

When 60 cycle input is used the term $2\pi f$ equals 377. When the 660 cycles input is used the term $2\pi f$ equals 4144.8. If Z is a value ten to fifteen or more times the value of R then R can be neglected with a small loss in accuracy. The inductance formula becomes simplified to:

$$L = \frac{Z}{2\pi f} \text{ henrys}$$

with the letters having the same meaning as in the preceding formula. All capacity measurements will neglect the R value because the



Measuring impedance without standards of capacity and inductance

series resistance of a condenser is rather difficult to measure. The formula for capacity is:

$$C = \frac{10^6}{2\pi f Z} \text{ microfarads}$$

with the letters having the same meaning as in the first inductance formula.

In any measurement of inductance and capacity it is well to keep in mind that for a given frequency as the impedance of a number of condensers goes down the capacity value will go up. For a given frequency as the impedance of a number of inductances goes down the value of the inductance will also go down. In other words, the impedance of a coil varies directly with frequency, but the impedance of a condenser varies inversely with the frequency.

The two frequencies applied to the resistance-impedance balancing circuit have the following ranges:

60 cycles	0.2 – 40	henrys
	0.2 – 40	microfarads
660 cycles	0.02 – 3	henrys
	0.02 – 3	microfarads

The audio oscillator consists of a one tube audio oscillator and a two tube audio amplifier. The audio oscillator is not the only type that can be constructed. It was selected because it is about the most simple yet stable single frequency audio oscillator in the literature. Figure 4 shows the full schematic. It uses only resistances and condensers and thus can be built quite compactly. The oscillator is a phase shift oscillator, and the frequency is determined solely by the value of the identical condensers and resistances in the three section mesh. This circuit was patented over 20 years ago, but never used until recently. It is interesting to note that a two mesh or two section mesh between the plate and grid will not sustain oscillations — three or more sections are necessary. There is about a 50 to 60 degree phase shift in each section of the mesh of the feedback voltage wave from the plate before it reaches the grid.

The two tube audio amplifier is added to add stability to the oscillator and to provide a current source for the input to the resistance-impedance balancing network. This is particularly necessary when the nonvacuum tube a.c. voltmeter is used in conjunction with the resistance-impedance balancing network. If an a.c. vacuum tube voltmeter is used the final amplifier stage is not necessary, but does make the unit more versatile. The components as selected give a frequency of 660 cycles. Smaller resistances and condensers in the mesh

will cause oscillation at a higher frequency.

The power supply is entirely standard with the possible exception of the use of the five volt winding for the 60 cycle input for the resistance-impedance balancing network. Figure 5 is the schematic. Note that the five volts goes to an insulated jack.

It is important to check that the output of the oscillator and the five volt winding do not ground except within the resistance-capacity or resistance-impedance balancing network.

For some shops the range of measurement obtainable with 60 cycles may be sufficient. In that case, the audio oscillator need not be constructed, as an ordinary 110 to 6 volt filament transformer will serve. The 6 volts output should be hooked to an insulated jack. This will then serve as the signal input to the impedance-resistance balancing circuit.

During the operation of the units one throw of the DPDT switch will be followed quickly with the closing of the switch to the voltmeter. When this is done quickly enough in close succession a ballistic throw of the needle of the voltmeter will be noted. Use the point of maximum throw for comparsion. Do not attempt to use steady values because these will vary especially when condensers are measured. Naturally when beginning to use the units some rough standards will show if proper operation has been learned.

Any further problems can be discussed with the writer by mail in care of this magazine.

References

Ginzton and Hollingsworth, "Phase-Shift Oscillators," Proceedings I.R.E., Feb., 1941, p. 43.

Michels, W. C., *Advanced Electrical Measurements*, 2 ed., D. Van Nostrand, 1941, pp. 257, 258 (discussion of Dowling's original method).

SPINNERS — MAKE THEM YOURSELF

ALLEN R. MATZ

and

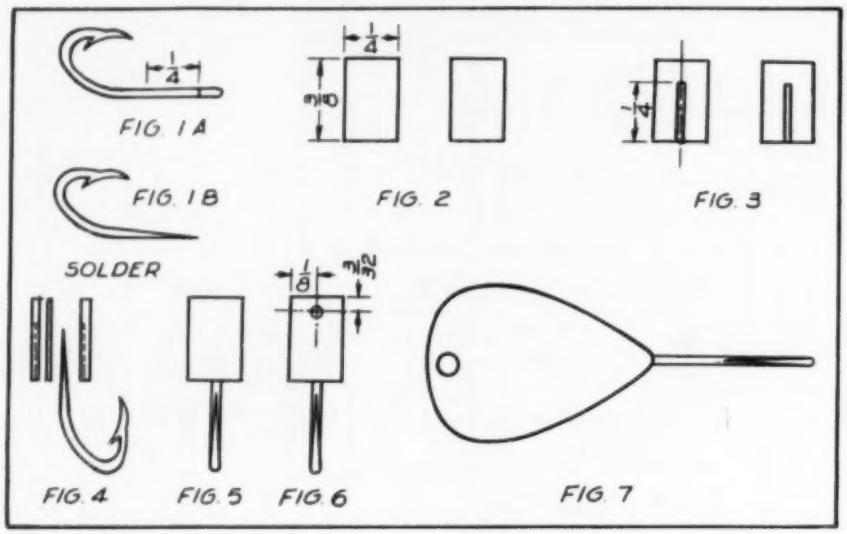
WILLIAM WIESER

Harrison Technical High School

Chicago, Ill.

Every boy who is interested in fishing at some time or other attempts to make his own fishing lures. It is easy enough to go to a sporting goods store and buy spinners, but the added thrill in knowing that you have been able to fool the fish is worth all of the effort required to make one. They are easy and inexpensive to make. We figure the cost at about three cents per spinner. If you purchased the same spinner the cost would be about one dollar. This type of spinner has proved to be effective with perch, blue gills, crappies, and herring. It was developed as an extracurricular activity for those interested in fishing. It is not meant to be used as a class project.

Following is a list of the tools and materials needed, and the step-by-step procedure to be followed in making such a spinner.



Enlarged views of the spinners by Allen R. Matz and William Wieser

Tools and Materials

Long shank No. 10 fishhook, silver plated. Two pieces 28-gauge stainless steel ¼ by ⅜ in. Copper or brass approximately .015 thick may be substituted. Stainless steel solder and flux, long nose pliers, bench grinder, file, ⅛-in. drill, ½-in. chisel, and hand drill.

Procedure

1. Cut hook ¼ in. from base of eye. See Figure 1-A.
2. Grind or file shank of hook, tapering to a pin point. See Figure 1-B.
3. Make slight groove, with rounded chisel, on one side of each piece of stainless steel, as shown in Figures 3 and 4.
4. Fit hook into groove. *Hook must be at right angles to steel.* See Figure 5.
5. Spread small amount of flux and solder on pieces.
6. Holding entire assembly with pliers, heat solder over flame to melting point. Add flux and hold until solder cools.

CAUTION: Be sure hook is at right angles to steel.

7. Drill 1/16-in. hole approximately 3/32 in. from top. See Figure 6.
8. File or grind to pear shape, as shown in Figure 7.
9. Polish and buff to a high shine.

When the new 53,000-ton ship S. S. UNITED STATES raced across the Atlantic to bring speed record honors to this country for the first time in 100 years, her four massive propellers were driven by boilers fueled from tanks holding 2,000,000 gallons of oil. The proud success of this great new ship is another indication of the way in which American ingenuity, industry and skill bring about record-breaking results. — *Petroleum Newsnotes.*

Uncle Sam is the largest publisher in the world, issuing over 25,000 items each year. The 334 private publishers in the United States issued only 11,840 titles in 1952. — *National Chamber Washington Report.*

The walnut lamp. Stan Schirmacher, High School, Cottonwood, Ariz.

LETTER RACK, INKWELL, AND PENHOLDER

ALBIN A. GREGG
Industrial Arts Dept.
Wicomico High School
Salisbury, Md.

This letter rack, ink well, and penholder was designed to serve as a beginning project in the woodshop. Its greatest value lies in the fact that it contains a wide variety of operations. Ordinarily, several beginning projects are needed to cover these fundamentals. Upon completion of this project the students can go on to more intricate work without building many time consuming intermediates.

These are the operations which are involved in making the project:

1. Squaring a board
2. Planing a taper
3. Cutting dadoes
4. Cutting grooves
5. Boring with the expansion bit
6. Cutting rounded corners

Operation sheets can be made up and demonstrations given for each of the above items.

Three pieces of wood are used for this project. The base is best made of white pine or poplar with the uprights cut from ¼-in. plywood. Plywood is used for the uprights because beginning students would have too much difficulty planing thin solid wood. If a student should ruin a piece of wood the loss is not great since the parts are so small.

The student can be called upon to do some original thinking in designing an inlay or an overlay for the front upright. This design can be geometric or in the form of a monogram. A wood burner can also be used to design this front upright.

An orange shellac finish is recommended for beginners and several coats of wax can be applied for the final polishing.

AWARDS PLAQUE

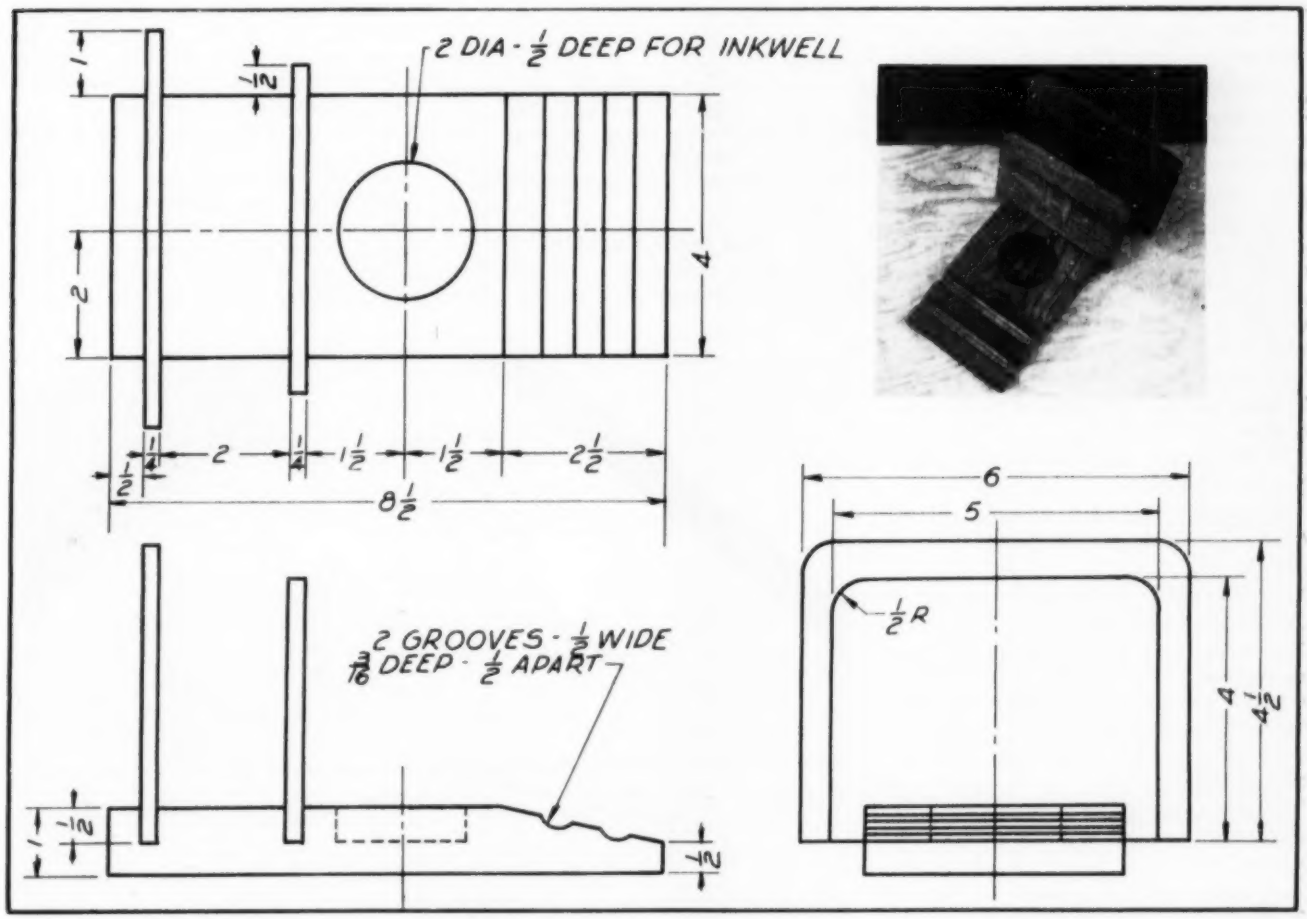
ROY H. DUNGAN
Industrial Arts Dept.
Springfield Township High School
Montgomery County, Pa.
and
Lecturer, Temple University
Philadelphia, Pa.

Intramural champs? Home-room winners of a basketball tournament? How can they be rewarded?

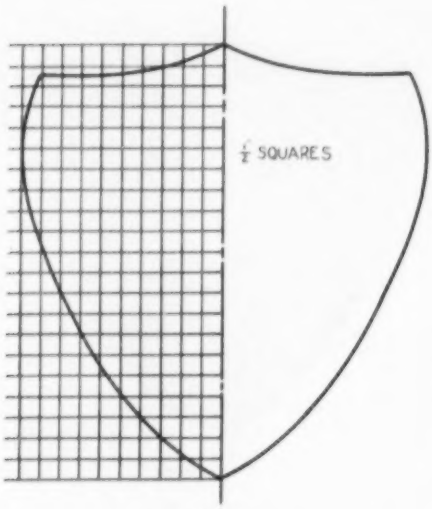
This problem can be solved by an assembly presentation of an attractive awards plaque that may be displayed on the wall or in a trophy case.

Skills involved in this project are: layout, woodworking, finishing, and lettering with a paint brush.

Awards plaque



Letter rack, inkwell, and penholder



Awards plaque

Procedure

1. Lay out pattern on drawing paper. Since shape is symmetrical, only one side need be laid out.

2. Transfer outline to piece of ¾ by 10 by 10½-in. maple or oak.

3. Cut plaque to desired shape on jig band saw.

4. Sand to finished shape.

5. Shape front edges of plaque to desired contour with portable router. Available cutters will determine the contour of the edge.

6. Sand edges with fine sandpaper.

7. Inspect the front surface for any dents or bruises. Apply hot water to any dents found, repeating operation as needed. This will cause the surface cells of the wood to swell, thus bringing the damaged area to the level of the surrounding surface.

8. Check for oil or grease on the surface. If found, remove by rubbing with benzine or naphtha.

9. Thoroughly sand entire plaque with No. 2/0 sandpaper.

10. Apply a first coat of white shellac. Add from 25 to 50 per cent alcohol to stock solution.

11. Allow from 2 to 4 hours for drying and then rub down with No. 2/0 steel wool.

12. Apply successive coats of white shellac (number optional). Each coat should have a smaller amount of alcohol introduced. Repeat step 11 after each coat.

13. Apply face design with small brush, using a good enamel paint.

14. Finish with a coat of wax applied with a soft cloth, rubbing with the grain of the wood.

15. Plaque may be prepared for hanging by inserting two small hook-eyes in the back, connected by a piece of wire.

OBJECTIVE EVALUATION OF DRAFTING PLATES

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Technical High School
Omaha, Neb.

Objective evaluation of pupil achievement is always sought for by educators as a device for both pupil promotion and course evaluation. In the classroom, where the instructor deals with individual personalities, it is almost impossible to keep one's emotions from altering the true or approximately true evaluation of pupil achievement. This fact is especially evident where classes are held for more than one period and where the instructor has pupils for more than one year in a particular course as is the case in vocational education. For this reason the author designed a rating scale or check list which took form as a rubber stamp. This rating scale not only makes evaluation of drawing plates more objective but serves as a reminder to the pupil as to what areas to concentrate on to improve his plates. Then, too, the rating scale helps point out to the pupil the important characteristics looked for in a good drawing. The author, at the beginning of each course, explains the rating scale to the pupils and then lets each pupil rate his first drawing plate; thus helping the pupil to obtain a more accurate and complete idea of how the rating scale works and brings to his attention the important characteristics for him to look for when making a drawing plate.

How to Use the Scale

Each time a drawing is turned in to the instructor for grading, the instructor places the stamp just above the title box. See Figure 1. As the reader can note, the rating scale has six different scales on which to rate each drawing. In other words, each drawing is graded six times; thus helping to achieve more objectivity. The instructor places an *X* for each scale or characteristic in the appropriate grade column. After the drawing has been rated against all six scales the instructor glances at the array of *X*'s and assigns an average grade which goes in the title box and which is the grade of said drawing.

STEP-BY-STEP PROCEDURE FOR CORRECTING DRAWINGS

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Supervisor of Drafting
Detroit Parochial Schools
Special Instructor, Department of Industrial Education
Wayne University
Detroit, Mich.

Correct the pupil's work while he is drawing, not after he has finished the sketch. The boy with a badly marked-up set of drawings has no incentive to keep them or to show them to others. Completed drawings should be correct as far as arrangement of views and dimensioning are concerned. These jobs will then have permanent value, besides providing psychological advantages to the student.

To turn out a maximum amount of work, of good quality, both teacher and student must follow a definite system. Many experienced teachers have developed a step procedure. However, some of the newer instructors are still undecided as to *where* one step ends and the next one begins. The outline shown here is designed to help the latter group.

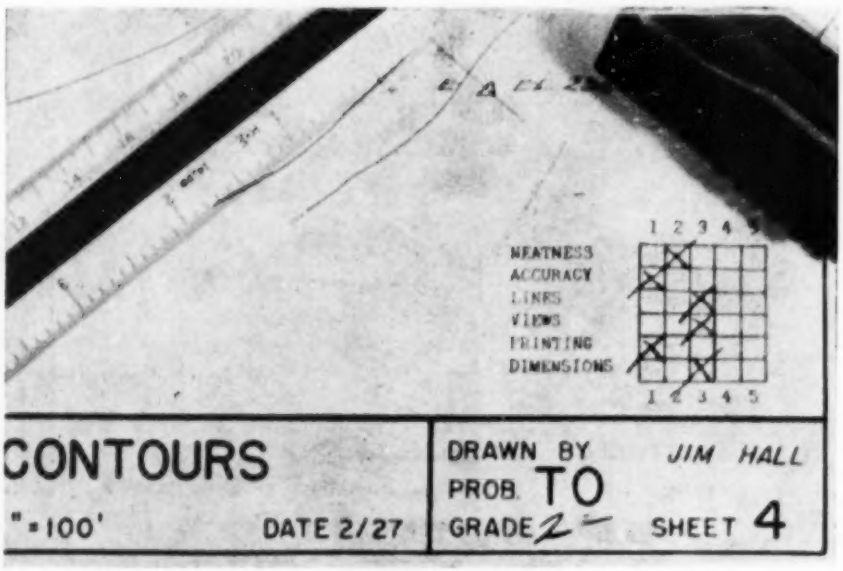


Fig. 1. The rating scale

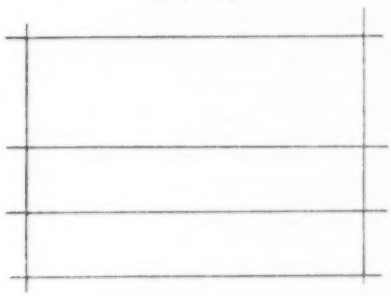
The procedure described is based on the premise that anything correct on the drawing can easily be darkened, while anything incorrect can easily be changed.

All jobs are done first as freehand sketches. On these sketches, such matters as number of views, arrangement of views, and dimensioning, can be worked out. The instrument job, coming later, is then merely a matter of copying.

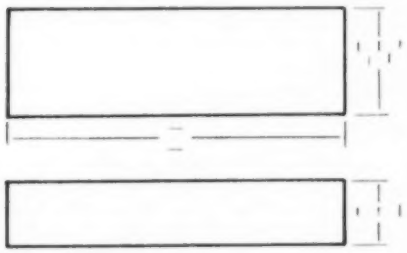
Steps — Sketches

1. *a*) Outline (very fine lines) all necessary views. Horizontal lines in front view should extend through side-view area. Vertical lines in front view should extend through top-view area.
   Get teacher's approval in writing. (Initials)

STEP ONE



STEP TWO



2. *a*) Darken object lines.
   b) Erase loose ends left from first step.
   c) Draw extension lines.
   d) Draw dimension lines.
   e) Draw very fine guide lines for dimension figures. (These will establish proper uniform size of dimension figures.)
   Important: No arrowheads nor dimension figures in step two. These will be added *after* teacher approves, or changes, the dimensioning system.
   Get teacher's approval in writing.
3. *a*) Dimension figures.
   b) Arrowheads.
   c) Lettering, notes, etc.
   Make final check with instructor before turning in job.

Steps — Instrument Jobs

1. Same as step one for sketches. Teacher will check placement of views and accuracy of measurements. Beyond this step, the job is a matter of copying the sketch, since all corrections have been previously made. Any further markings by the teacher should be grading or commenting on the work. Comments should be written on the back of the drawing sheet, or on another sheet of paper.

MEAT TENDERIZER

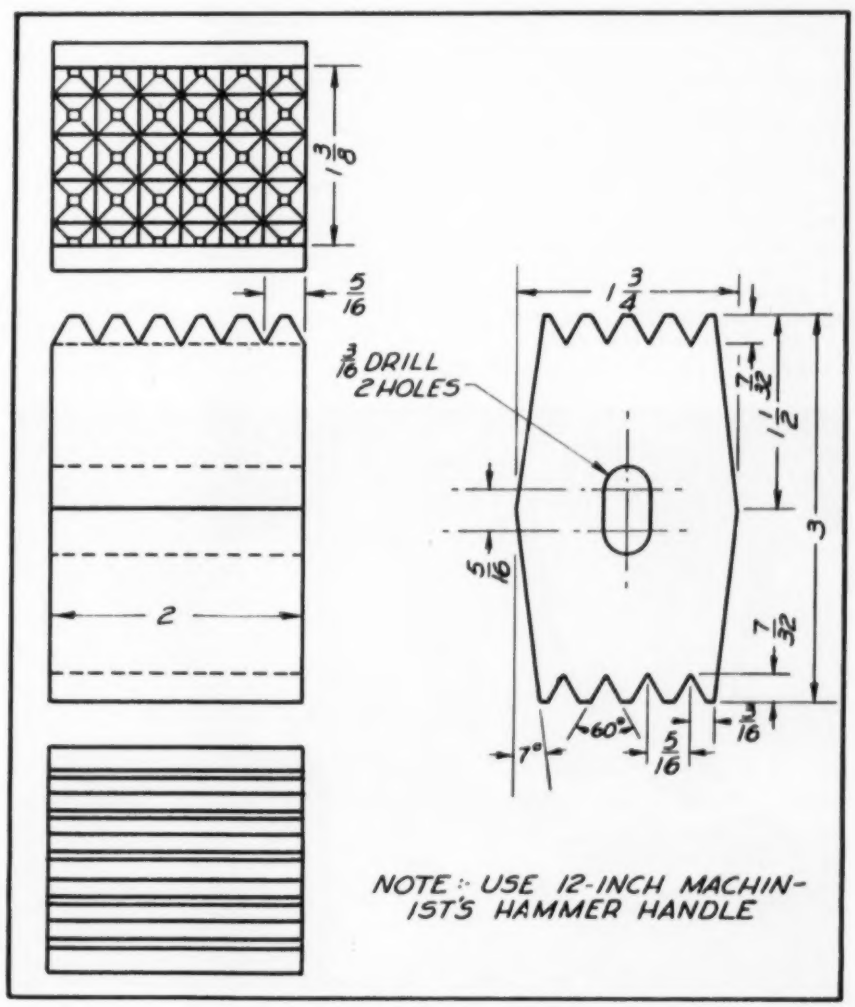
E. ROGER ETTER

Mt. Olive, Ill.

In searching for a project to be made on the shaper I designed the meat tenderizer illustrated and described in this article. It seems to have great boy appeal as it is something that Mom can use.

It also serves well as a milling machine project.

The tenderizer is made of aluminum and has about the right weight for this type of kitchen tool.



Details of the meat tenderizer

A SUBSTITUTE FOR SANDPAPER

JACK DOWN

East Lansing, Mich.

If you are an industrial-arts teacher operating within a limited budget, you have no doubt been appalled at the sizable chunk you have considered necessary for sandpaper. Then, on top of that, you have undoubtedly gotten many pains in the proverbial neck trying to keep it from being wasted.

The writer has found a partial answer to this problem. One so simple that it is surprising that other shop teachers have not thought of it themselves.

When the writer taught in Samoa he found that broken glass was used for nearly every smoothing operation. It is used as a scraper and since glass usually does not break straight across an edge, the broken piece usually has a highly efficient scraping edge. For large flat areas I recommend sandpaper but for any smaller area, flat or curved, and for end grain,

a small piece of broken glass will do a faster, smoother, and an ever so much cheaper job.

For anyone who thinks this sounds dangerous, it must be remembered that the same students will be using sharp saws, chisels, planes, etc. Cuts are rare even though most of the Samoan students are barefoot.

The glass, however, becomes dull quite rapidly and must then be discarded.

THE RACINE PLAN FOR IN-SERVICE TRAINING

KENNETH L. SCHANK

Racine, Wis.

The junior high schools of Racine are undergoing a revision of curriculum so in order to keep up to date in the growing plans Harlan J. Shufelt, consultant in industrial arts, is conducting an in-service training program for the shop instructors. The course is 16 weeks in length and will provide brush-up experiences or new knowledge in most phases of shopwork for approximately ten teachers. The evening classes are conducted by the consultant and various other qualified instructors in the system, or by outside consultants as their need becomes apparent. Three meetings were held on junior high school printing at the Lincoln Junior High in Kenosha, two on plastics at Washington Junior High in Racine, and two on electricity at Park High, Racine. A field trip to one of the local industries is planned for the future.

Most of the planning is being done as a group because of the varied interests and needs. Most instructors recognize the value of a *brushing up* after they have been away from a certain subject for a few years or are going to add an entirely new unit to their programs.

Definite costs, books to order, types of tools, supplies, visual aids, safety, and procedures have highlighted all of the meetings so far. This is a concrete course with no frills or padding, planned to keep the industrial-arts program in the foreground educationally.

Racine teachers take a look at the art of bookbinding. From left to right: K. L. Schank, J. A. Woolley, G. A. Todd, and W. H. Schubert

SHEET METAL DRILLING WITH TWIST DRILL

B. HARRY GUNDERSON

Associate Professor of Industrial Arts

Eastern Illinois State College

Charleston, Ill.

A standard twist drill with a special ground lip (hollow-ground) may be used to cut *round* holes in sheet metal. Theoretically, if a twist drill is used to cut metal to a thickness less than will support the drill before it cuts its full diameter (to the margin of the drill), it will have the tendency to cut an off-round hole. One way to avoid this difficulty when drilling sheet metal is to support the drill in a *drill bushing*. Bushing installations for most industrial education laboratory conditions are not practical to use and are expensive to acquire, therefore, the writer has found the hollow-ground lip a solution for the miscellaneous drilling of holes for thin metal on a nonproductive basis.

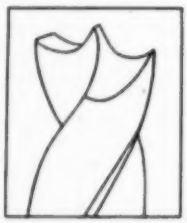


Fig. 1. From "How to Get More Service From Your Blue-Point Drill"

— Courtesy, Mr. John Conron, publication editor, Snap-On Tool Corp., Kenosha, Wis.

The writer was first taught the hollow-ground lip grinding technique by a foreman about 1935, in a manufacturing sheet metal plant in Richmond, Ind., who in turn had been taught by a *floater* sheet-metal tradesman. The writer has used the special drill to an equal advantage in both the sheet-metal trade work and in industrial education laboratory training. Since using this drill grinding technique in teaching and in various trade jobs in sheet metal and occasionally in machine-shop work, the writer has not found a handy reference about it until the publication of the pamphlet, *How To Get More Service From Your Blue-Point Drill*.[1] On page 15 in this pamphlet is a paragraph description of "Sheet Metal Drilling"[1] with an illustration of this hole-cutting technique as shown in Figure 1. The writer finds this drill grinding technique useful in technical schools, teacher training, industrial education laboratories and in industry, provided these drills are used only for the intended purpose and are always *stored with other special tools*. Confusion will result if the drills ground for drilling holes in sheet metal are placed with other drills.

Procedure for Sharpening Twist Drill for Cutting Holes in Thin Metal

1. Start with a drill ground to the standard 118 deg. included angle. Use a high-speed drill, if possible.

2. Use *sharp* corner of the straight grinding wheel (the wheel usually used for hand grinding drills) and make the first trial lip grind using the same back-off (or clearance angle) as for the standard drill grinding (usual angle of clearance is 12 deg.).

3. Finish grinding the second lip to the angle that will permit the dead center of the drill to extend *above* the two cutting lips on the circumference of the drill. The two lips, for accurate drilling, must be equally spaced between the dead center of the drill, as shown in Figure 1.

NOTE: The correctly ground drill will cause the protruding dead center to serve as a *pilot* and the cutting lips to cut *through* the thin metal *first*, thus giving a metal-punching effect.

Drilling Technique for Using Twist Drill Ground for Cutting Holes in Thin Metal

1. Center punch for hole location as usual.

2. *Ring hole* with dividers and punch with prick punch for proof lines, if a check for accuracy is necessary.

3. Reduce cutting speed to about one third the amount used for standard drilling, to help preserve the cutting keenness at the circumference of the drill.

4. If more than one-thickness stock is drilled at one time, remove the tit or blank

[1] "How To Get More Service From Your Blue-Point Drill, "Sheet Metal Drilling," Snap-On Tools Corporation, Kenosha, Wis., p. 15.

each time one thickness of metal has been cut.

5. Hole cutting for thin metal may be done in the turret lathe or engine lathe if the operating conditions described in items 3 and 4 are observed.

DEMONSTRATION PANEL MADE OF RADIO KIT PARTS

FRED M. KENNEDY, JR.
Screven County High School
Sylvania, Ga.

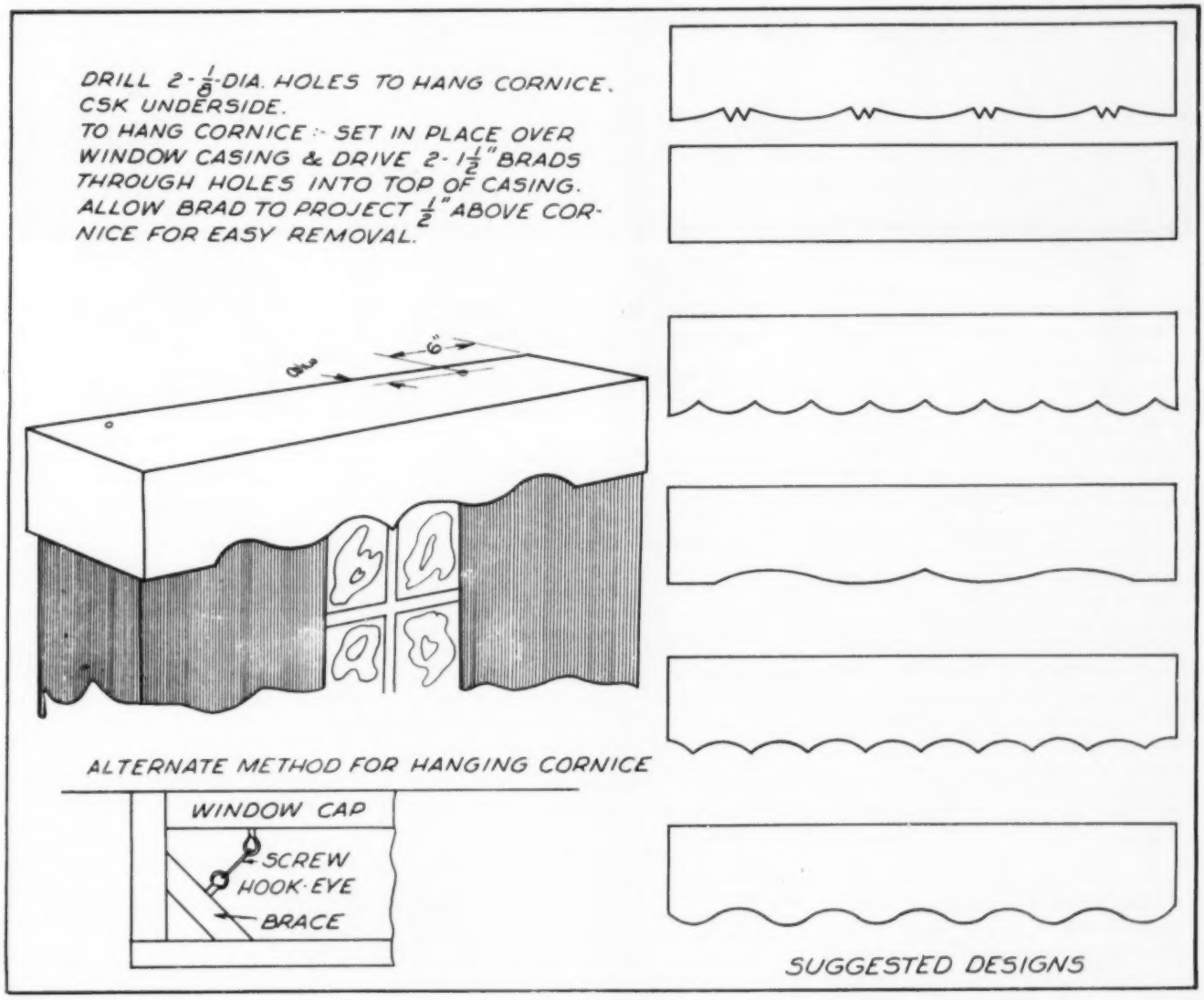
Many industrial-arts teachers would welcome the addition of certain teaching aids such as radio demonstration panels if their budget would permit the added expense. This panel will meet the needs of the average electricity and radio course and can be built at a very nominal cost.

The panel consists of a 5-tube a.c.-d.c. superheterodyne, selected because of its popularity in table models, with the following tube complement: 12SA7, 12SK7, 12SQ7, 35Z5, and 50L6. The demonstration unit is designed to simplify instruction in theory of radio circuit design, facilitate ease in circuit tracing, provide a clear-cut visual aid in teaching the relationship of the physical parts and their respective schematic symbol, and the proper use of test equipment in repair work. Multiple Nu-way snap connectors are used on each tube element connection for signal and voltage measurement and at each circuit junction so that actual conditions found in trouble shooting may be simulated. Trimmers are accessible from the front of the panel for demonstration of alignment procedures.

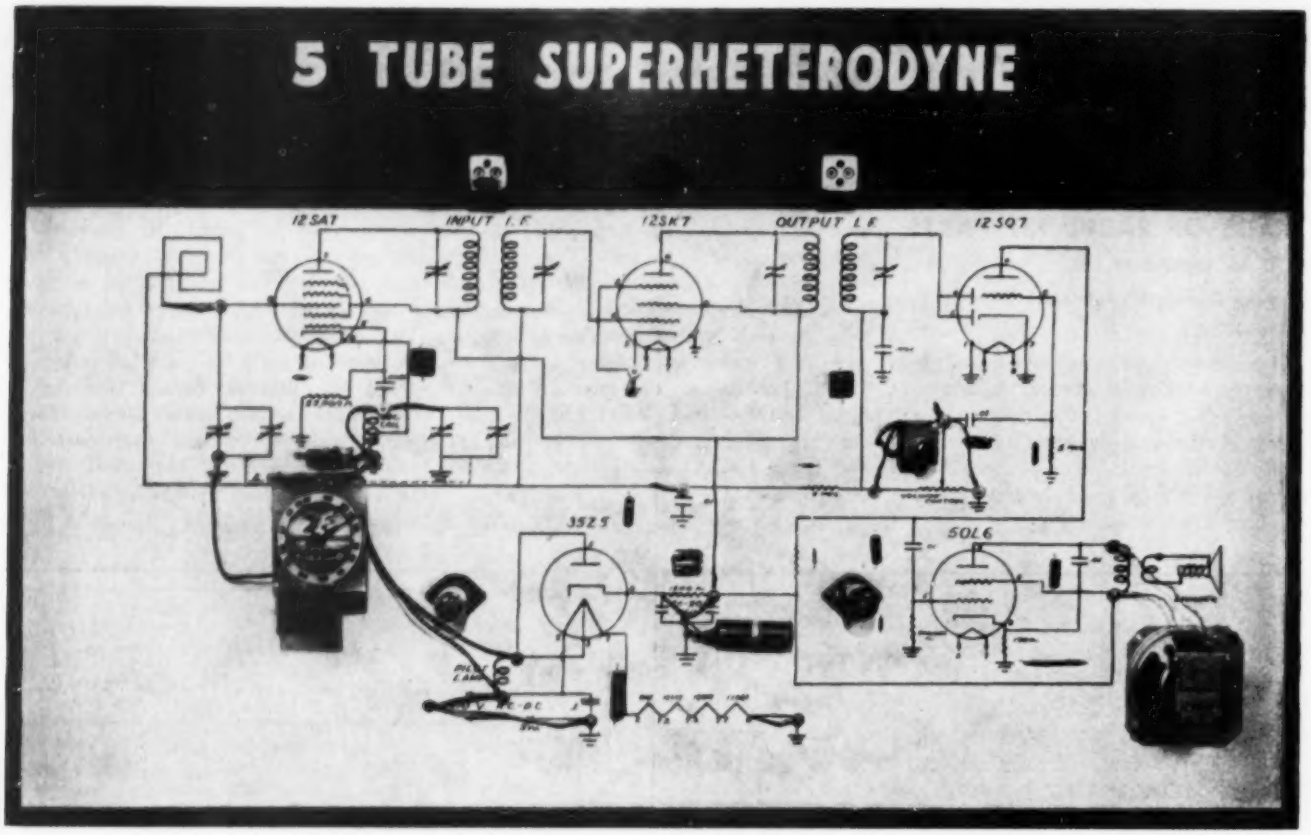
This unit was built from parts included in a regular kit designed for chassis construction, and mounted on a ¼-in. plywood panel. The only additional parts required are some Nu-way snaps, studs, and lugs and hook-up wire.

The schematic diagram was drawn on regular white poster board with black India ink. The component parts of the circuit were shifted about to permit the mounting of the parts of the kit. After schematic diagram was completed and glued on the board, it was sprayed with a coat of clear lacquer. This minimized dirt smudges during the mounting of parts. A piece of clear thin plastic was used to make a template for drawing the coil and resistor symbols. Sheet-metal mounting brackets were made for variable condenser, dial, and volume control.

The cost of such a demonstrator if purchased from an electronics distributor would


DRILL 2-⅛-DIA. HOLES TO HANG CORNICE. CSK UNDERSIDE.
TO HANG CORNICE :- SET IN PLACE OVER WINDOW CASING & DRIVE 2-1½" BRADS THROUGH HOLES INTO TOP OF CASING. ALLOW BRAD TO PROJECT ½" ABOVE CORNICE FOR EASY REMOVAL.
6"
ALTERNATE METHOD FOR HANGING CORNICE
WINDOW CAP
SCREW
HOOK-EYE
BRACE
SUGGESTED DESIGNS

Window cornice by Louis Barocci, Cudahy High School, Cudahy, Wis.



Radio demonstration panel

run above $40. At the time this kit was purchased the price was $11.16. Recent price increases on all electronics equipment will render this figure much higher. In this particular case experience gained through building this panel was priceless. Many difficulties were encountered in attempting to align the set due to long connecting leads. After much experimentation, many of the grid and plate leads were shielded and grounded to eliminate interference, feed-back, and induced signals.

The performance of this panel is comparable to any similar set. It is very flexible and invaluable as a visual teaching aid in a field that requires visualization of such intangible phenomena as electron flow, detection, radio and audio frequencies. It lends itself well to the use of an oscilloscope in the observation of wave forms in the various states of the circuit.

A plastic bag was made to slip over the entire panel to prevent collection of dust and dirt.

While drilling the deepest well in the world, oil men took a routine "bottom-hole" temperature at 20,003 feet and found it to be 334 degrees F., more than hot enough to cook your Sunday dinner. — *Petroleum Newsnotes.*

ENGLISH IN TRADE AND VOCATIONAL SCHOOLS

J. ALLEN MORRIS
Murray Vocational School
Charleston, S. C.

(See preceding articles in January, September, November, 1948; January, May, June, November, December, 1949; February, November, 1950; February, March, and June, 1951, issues)

Punctuation: Simple Sentences

Most vocational school students need a great deal of assistance before they are able to use punctuation marks satisfactorily. When they first start to write themes, letters, reports, and other forms of written work, their punctuation is usually guided entirely by guesswork. They have practically no *sentence sense*, cannot tell one kind of sentence from another, and have formed no habit of using marks of punctuation correctly.

The problem is further complicated by individual differences, presenting almost a hopeless maze of mistakes. Great patience on the part of the instructor is necessary, for he is engaging in a struggle that must continue for several years. Before it is over, thousands of sentences must be written and many hours spent at the board, explaining over and over the principles which are necessary. Finally, after the long period of learning and practicing is over, his students are able to punctuate their written work almost perfectly — and they know what they are doing, and why.

In the first year's work only one kind of sentence is stressed continually: the simple sentence. To begin working on this type of sentence, the instructor should ask for a definition of the word *sentence*. The answers will usually produce the traditional *group of words containing a subject and a predicate and expressing a complete thought*. This is technically correct but almost completely valueless to vocational school students because they do not know what a subject is, have no understanding of the word *predicate*, and cannot tell one *complete thought* from two or more complete thoughts. For purposes of checking their own work, students find the old definition useless; hence a simple, more practical one, **S — V — S** should be substituted. Each first-year student is required to learn the following:

Sentence: S — V — S

Tom is working on his car in the Auto Shop.

This is a sentence because it has a subject and a verb and makes sense. A capital letter should be used at the beginning of the sentence and a period at the end.

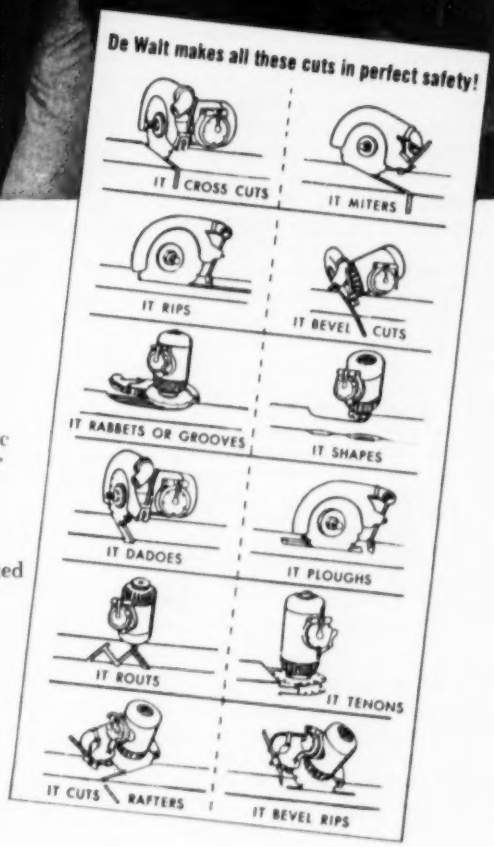
S — V — S = Subject — Verb — Sense = Sentence

(Continued on page 14A)

"I'm really sold on AMF De Walt as a safe multi-purpose tool!"

says E. F. Wilson, Instructor, Vocational Agriculture Dept., George Wythe High School, Wytheville, Va.

AMF De Walt's big *SAFETY-PLUS* feature—the School Safety Guard—has brought all-new safety to school shops.



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ENGLISH IN TRADE AND VOCATIONAL SCHOOLS

(Continued from page 158)

For a while only the word *sense* can be used by students as a simple, useful test. If a group of words makes sense, it is a sentence. Even slow students can use this test, and their work begins to show a little improvement. They will use more capital letters and more periods in their papers.

As the work of the class progresses, class periods are devoted to studying subjects and verbs — until boys can look at a group of words and recognize that it has a subject, a verb, and *sense* — that it is a sentence. Once this stage has been reached, the punctuation of written work again improves.

Grammar books and workbooks contain numerous sentences that can be used for board work and class or homework assignments, but students are generally much more interested in their own sentences and their own mistakes in punctuation. Using the boys' work as a source of practice sentences, the instructor should discuss with them what mistakes they have made in punctuating their simple sentences, day after day throughout the first year, stressing chiefly the necessity of using a capital at the beginning and a period at the end of each normal simple sentence.

First-year students write very few questions and cannot achieve mastery of the use of the question mark; so this should be mentioned occasionally but not emphasized particularly. Mastery of the question mark should not be required until the senior year.

In the first year, work on prepositional phrases and dependent clauses begins. The chief idea stressed is that a phrase has *no subject — no verb — no sense* (just the opposite of a sentence) and so is not a sentence; therefore a phrase should not be written with a capital and a period. Several drill sheets, containing numerous prepositional phrases, give the boys practice in learning what these phrases and dependent clauses begins. The The following is an excerpt from one of the drill sheets:

II. A phrase should not be written with a capital and a period as if it were a sentence. Commas and semicolons are not usually used with phrases. Copy the following sentences and punctuate them correctly:

1. in the middle. Of the street. Was a policeman, 2. the boy. won a prize. For winning the race, 3. in the drafting room. the boys. Are making blueprints. 4. by the open window. Stood a man. With a pistol. In his hand 5. into the house, on the corner, ran, the man, after the boy

When work on dependent clauses begins, it is made as simple as possible. Instead of *dependent clauses* or *subordinate clauses* I use the term *weak clauses* — a term that my students learn to understand quickly. In the first year the main idea stressed is that a *weak (dependent-subordinate) clause* is not a sentence, *because it does not make sense*. For this reason a *weak clause* should not be written with a capital and a period. Several drill sheets, presented with frequent explanations, give boys practice in learning to recognize the difference between a *weak clause* (S — V no sense) and a sentence (S — V — S). The term *complex sentence* is not used in connection with the first year's work, but is introduced in the next year's work. Short *weak clause sentences* like these are used for beginners:

I. when a weak clause starts a sentence use a comma don't use a comma unless the weak clause starts the sentence he ran to get help because his car was on fire i don't know where he put the chisel when i showed him my drawing he laughed at me after the boat is painted i'll put it away for the winter i could not come to your house last friday because i was in columbia s c while i was waiting for the bus i saw three cars with north carolina licenses if you are going to the meeting on marion square we can go together on our bicycles before you start on your trip you'd better have your car examined

Mastery of prepositional phrases and dependent clauses is not required in the first year's work, but each student must be able to recognize in his own work the simple sentence and must be able to punctuate most of the simple sentences correctly before he is eligible to begin the work of the second year.

ASSOCIATION NEWS

COMING CONVENTIONS

Apr. 1–3. National Science Teachers Association, at Morrison Hotel, Chicago, Ill. Secretary, Robert H. Carleton, 1201 Sixteenth St., N.W., Washington 6, D. C.

Apr. 1–3. Texas Vocational Association, at Plaza Hotel, San Antonio, Tex. Secretary, Louis F. Koudelik, 705 Fannin, Houston, Tex.

Apr. 2–3. West Virginia Industrial Arts Association, at Jackson's Mill, W. Va. Secretary, Anthony Kolitsch, High School, Phillipi, W. Va.

Apr. 8–10. Florida Vocational Association, at McAllister Hotel, Miami, Fla. Secretary, Mrs. Julia Burns, Brewster Vocational School, Tampa, Fla.

Apr. 8–10. Illinois Vocational Association, at Leland Hotel, Springfield, Ill. Secretary, Paul R. Waugh, Board of Education, Peoria, Ill.

Apr. 8–10. New York State Vocational and Practical Arts Association, at Hotel Statler, Buffalo, N. Y. President, Joseph C. Deluhery, 1500 Elmwood Ave., Buffalo 7, N. Y.

Apr. 9. Industrial Education Conference, at Iowa State College, Memorial Union, Ames, Iowa. Chairman, Lowell L. Carver, 101 Industrial Arts Bldg., Iowa State College, Ames, Iowa.

Apr. 9. Tennessee Vocational Association, at 202 Memorial Bldg., Nashville, Tenn. Secretary, W. A. Seeley, 202 Memorial Bldg., Nashville, Tenn.

Apr. 11–15. Western Arts Association, at Pantlind Hotel, Grand Rapids, Mich. Secretary, George S. Dutch, Geo. Peabody College, Nashville, Tenn.

Apr. 11–16. National Art Education Association, at Hotel Statler, Cleveland, Ohio. Secretary, Dr. Horace F. Heilman, S.T.C., Kutztown, Pa.

Apr. 12–15. American Personnel and Guidance Association, at Statler Hotel, Buffalo, N. Y. Secretary, Frank L. Sievers, 1534 O St., Washington 5, D. C.

Apr. 12–15. Pacific Arts Association, at Fairmont Hotel, San Francisco, Calif. Secretary, Dr. Harry B. Green, San Francisco State College, San Francisco, Calif.

Apr. 16–17. Missouri Industrial Education Association, at University of Missouri, Columbia, Mo. Secretary, Maurice L. Stewart, State Dept. of Education, Jefferson City, Mo.

Apr. 16–17. Missouri Vocational Association, at University of Missouri, Columbia, Mo. Secretary, H. H. London, University of Missouri, Columbia, Mo.

May 7–8. Wisconsin Association for Vocational and Adult Education, at Wausau Hotel, Wausau, Wis. Secretary, C. D. Rejahl, 211 N. Carroll, Madison, Wis.

May 31–June 5. Wyoming Vocational Agriculture Teachers Association, at Laramie University, Laramie, Wyo. Secretary, Rex Tolman, Burlington, Wyo.

GUIDANCE CONFERENCE AT STOUT INSTITUTE

Over three hundred teachers, administrators, guidance experts, and parents attended recently at an all-day guidance conference at Stout Institute. The conference was the third annual event of its kind sponsored by the college and was attended by persons from throughout the state.

Participants at The Stout Guidance Conference: (seated at left) Dr. H. Kent Tenny; (at right) D., Verne C. Fryklund; and (standing) Dr. Ralph G. Iverson

Keynote speaker for the conference, whose theme was "Understanding Individuals," was Dr. H. Kent Tenny, Madison pediatrician and president of the Wisconsin Medical society.

Topics discussed in nine sectional gatherings included camping experience, use of personality inventories, techniques of interviewing, problems of handicapped children, individual appraisal, uses of community resources, problems of exceptional children, use of vocational interest inventories, and the emotional growth and development of children.

(Continued on page 19A)

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Double duty SKIL tools in training and also in school maintenance. Students learn quickly —and safely—by using the same SKIL tools that are the standard of industry everywhere. And your *maintenance* crew will save time and money on miscellaneous repairing and general building upkeep.

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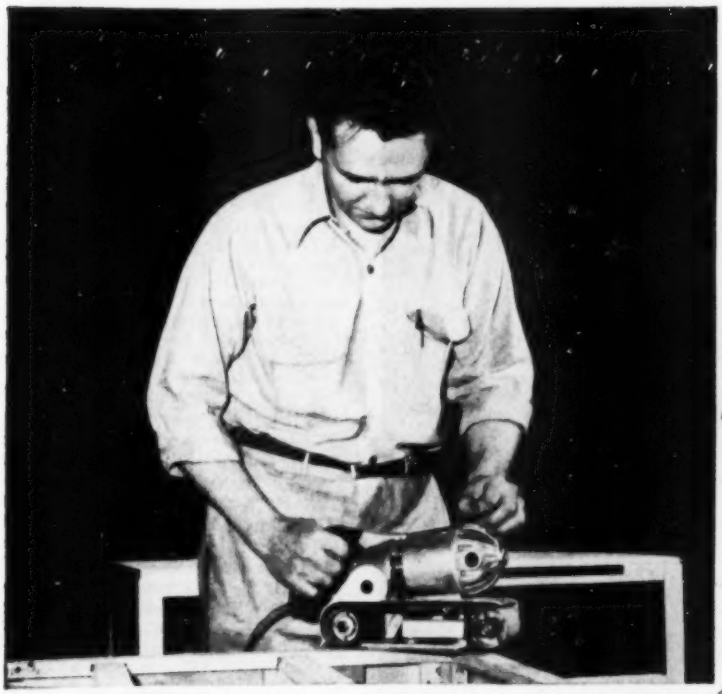
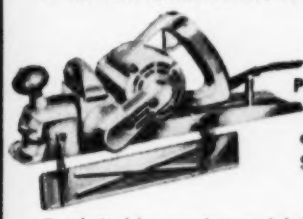


SKIL Belt Sanders Finest for Fast Finishing at Lowest Cost

The most popular tool for rough or fine sanding of wood, metal, stone, composition and other materials. Perfect for instruction in the art of fine finishing. The tool that will save the most time and money on refinishing desks and blackboards, and in general school maintenance. Belt width from 2¼" to 4½". Five models.

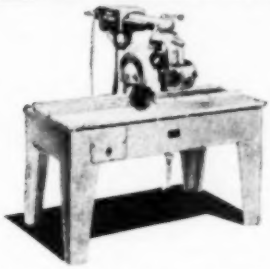


SKIL 3" Electric Plane Answers All Needs for both accurate Edge or Surface Planing.

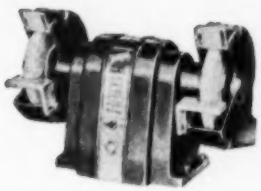
Cog-belt drive requires no lubrication—important where *many* people use a tool and depend on others for maintenance. Sharpening is simple and quick with an inexpensive SKIL attachment. Weighs a third less than comparable planes, sturdy and dependable.

The Wide Range of SKIL Drills—26 Models —Assures the Exact Power and Capacity for all School Needs.

Capacities up to 1" in steel, 2" in hardwood. Motors are reserve-powered, ideally balanced for easier use by the student or maintenance man. Optional speeds. Complete line of accessories, including drill stand to make low-cost, accurate drill press.



SKIL Radial Saws are *safest!* Controls are in *front*. Retractable arm clears work area. Sturdy blade guard adjusts easily. Controls recessed to prevent accidental starting. 2, 3 and 5 h.p., with 14" and 16" blades, 1 or 3 phase, all voltages, manual or magnetic control. A "must" for the maintenance shop; valuable in woodworking classroom.



New SKIL 6" Bench Grinder—Model 246. Indispensable for training and maintenance of cutting tools. New safety pilot light—an exclusive SKIL feature—prevents accidents where many people operate this tool. Lowest priced grinders with fully enclosed wheels, exhaust chutes, adjustable tool rests—all important safety features.

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PERSONAL NEWS

(Continued from page 6A)

Mr. Thomas was born in Brainard, Minn., on January 9, 1897. In 1902 he moved to Sedro-Woolley, Wash., with his parents and three sisters. He attended the Sedro-Woolley schools and was active in all athletic sports. He entered the military service and served with the U. S. Army in France during World War I. Upon his return, he attended Western Washington College of Education at Bellingham, Wash., receiving his B.A. degree.

He taught for several years in Skagit County before coming to Oregon. During his residence in Washington he was one of the organizers and charter members of Sedro-Woolley's Herbert C. Adams Post 2555 Veterans of Foreign Wars. He also was a member of the American Legion.

Mr. Thomas wrote several articles for INDUSTRIAL ARTS AND VOCATIONAL EDUCATION.

He is survived by his wife, Virginia, and a sister, Mrs. Robert Naubert.

♦ CAPTAIN JOHN SMITH, North Braddock, Pa., is filling the directorship post since the death of Mr. Geisler.

♦ RAYMOND KESTNER has accepted the position as co-ordinator at Rochester, Ind. Mr. Kestner succeeds Mr. Ross Blunk in this position.

♦ ROSS BLUNK has accepted a position as Superintendent of Buildings and Grounds at the Hamilton, Ohio, City Schools.

♦ WILLIAM QUICK, Central High School, Fort Wayne, Ind.; JOHN MCCULLOUGH of Greencastle, Ind.; CLIFFORD EVANS of Elkhart, Ind.; HENRY HODUS of Batesville; all teachers in industrial education, have received their master's degree in industrial education at Purdue University this summer.

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♦ DONALD SCHWARTZ, a June, 1953, graduate of The Stout Institute, Menomonie, Wis., is teaching in the Elkhart High School. He will develop a course in Building Trades.

♦ RUSSELL KULAWIZ has been employed as co-ordinator at Kendallville, Ind.

♦ THOMAS A. NEVITT is the new teacher of printing in the Industrial Education Department at Indiana State Teachers College, Terre Haute, Ind.

For the past four years he taught at Ahrens Trade High School in Louisville, Ky.

Mr. Nevitt served his apprenticeship at the Louisville Courier Journal after being graduated from Ahrens Trade High School, majoring in printing.

♦ ROBERT RILEY succeeds Clarence Needler as Trade and Industrial Co-ordinator in South Bend, Ind. For the past several years Mr. Riley has been teaching vocational classes in machine shop and woodwork in East Chicago. He is a veteran of World War II and a graduate of Purdue University.

♦ TIMOTHY W. ROSE, vocational co-ordinator and vocational director of the Crawfordsville City Schools since 1940, has accepted the new position of Director of Operations for the School City of Gary, Ind. His new job, among other things, entails the responsibility of maintaining building service to the 28 school buildings operated by the Gary School City.

♦ LOUIS ROBBE, Louisville, Ky., teaches the class in metals in the DuPont Manual Training School. His son, Phillip, is a student in the American College in Rome.

♦ JAMES R. MCDONOUGH, executive secretary, Hawaii Education Association, Room 1, Schuman Building, Honolulu, Hawaii, is a graduate of the Edgerton, Wis., High School.

♦ DONALD L. POUND has joined the staff in industrial education at Indiana State. He resigned his position as director and co-ordinator at Hobart, Ind., to accept the position as Assistant Professor of Industrial Education at Indiana State. He began his work on March 2, at his Alma Mater where he was graduated in 1931. He completed his M.S. degree at Purdue in 1948.

♦ MELVIN BERTRAM, 52 years old, died January 13, 1953. He had been printing instructor at Bosse High School, Evansville, since 1924.

Mr. Bertram studied at Indiana State College, Evansville College, and was graduated from the University of Arizona with a B.E. degree in 1949. He received his master's degree from Indiana University in 1949.

Mr. Bertram is survived by his wife and three children.

♦ DR. WILLIS L. PICKARD, 41, of the mathematics department at Northern Illinois State Teachers College, DeKalb, Ill., died on December 27 in Hines Veterans' Hospital. He is survived by his mother, Mrs. Ryan H. Wills, Inavale, Neb. Burial was in Franklin, Neb.

♦ LEBANON H. HARROD is teaching general shop in Schools 19 and 63 in Indianapolis. He began his work in these schools with the opening of the second semester.

Mr. Harrod received his B.S. and M.S. degrees at Indiana State. He was teaching in Jeffersonville, Ind., before he returned to Indiana State to complete his graduate work.

♦ JAMES C. DODGE, class of 1931 (The Stout Institute), has recently completed his M.A. degree at the Colorado State College of Education at Greeley, Colo. He has returned to his former job as associate professor of industrial arts at Colorado A. and M. College, Fort Collins, Colo. He teaches machine shop, welding, foundry, industrial-arts design, sheet metal and art metal.

♦ LEONARD OGLE is one of the new automobile mechanics instructors and WALLACE SMITH is a new instructor in refrigeration at the Oklahoma City University.

(Continued on page 18A)

STANLEY SHOP TALK

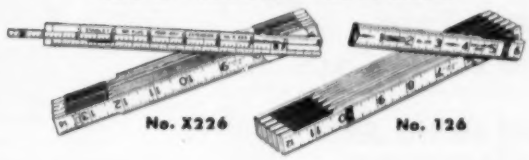
"PULL-PUSH" RULES

No. 6386W

The Stanley No. 6386W. For direct reading of inside measurements—no adding. White ½" blade with big, black numbers and entire length of both edges graduated in 16ths—top edge in 32nds for 6 inches. "Tru-Zero" hook for always exact measurements, inside and out—6 ft.

The Stanley No. 346W. "D" shape. Add 2" for inside measurements. Same easy to read numbers and graduations on replaceable blade. No. 346W—6 ft. No. 348W—8 ft. No. 3410W—10 ft.

"ZIG-ZAG" RULES



No. X226 No. 126

The Stanley No. 126. A new folding rule with square "Green Ends". Opens so students can gauge and scribe lines for even inches 2", 4", 6", 8", 10", 12", etc. Tough, hardwood sticks with wear-resistant plastic coating, big black numbers and ball-lock joints.

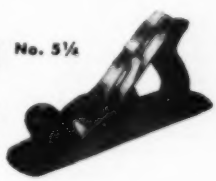
The Stanley "100 PLUS" No. X226. An extension rule with all the features of the No. 126 plus these extras—heavier, stronger sticks and 8" brass extension slide . . . extends both ways. Ideal for taking inside measurements.

BLOCK PLANE

The Stanley "100 PLUS" No. 118. Here's an all steel plane that's really BOYPROOF. Only three pieces, and the locked-in cutter adjustment prevents thread stripping or lost parts.

No. 118

JACK PLANE



No. 5¼

Stanley No. 5¼ Junior Jack. The ideal plane for boys at the junior high school level. Fast, clean cutting, easy to adjust, it's 11½ inches of balanced performance.

"YANKEE" SPIRAL RATCHET DRIVER

No. 130A

The "Yankee" No. 130A with quick-return spring in handle. Saves time and muscle. Supplied with three sizes of bits. "Yankee" Spirals available in three sizes, two styles. To convert this versatile tool for other jobs, buy accessories listed here.

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The Stanley No. 112. For heavier work; this general purpose drill cuts ½" in steel and 1¾" in wood. Bench stands are available for this, and all STANLEY ELECTRIC DRILLS.

No. 112

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PERSONAL NEWS

(Continued from page 16A)

♦ RANDOLPH PLATT is teaching mechanical drawing and bench woodwork at Bartlesville, Okla.

♦ JAMES FARRIS is teaching industrial arts at the Norfolk School, northwest of Cushing, Okla.

♦ TOLBERT W. BRANDON, formerly industrial-arts instructor in Fogarty Junior High School in Guthrie, Okla., is now teaching industrial arts in Los Banos, Calif.

♦ GEORGE KENNEMORE, instructor in machine and architectural drafting at Kelvin Technical High School, Winnipeg, Canada, for the past 33 years, retired in June, 1953.

HAROLD POTTER, one of his former students who has been teaching metalwork at Kelvin for some years, will succeed him.

♦ CHARLES SECHREST is teaching several of the "300 courses" at Wayne University, Detroit, Mich.

♦ J. A. VOJTA teaches drafting at the West Allis Vocational and Adult Education School, West Allis, Wis.

♦ JACK GONGEY is the printing instructor at Eastern Junior High School, Louisville, Ky.

♦ W. H. HEHLI is supervising principal at Mondovi, Wis.

♦ JOSEPH LONGO teaches mathematics, machine shop, and safe driving, at the Marinette Vocational and Adult Education School, Marinette, Wis.

♦ WILLIAM BETTENCOURT received his Ed.D. at Bradley University last June.

PERSONNEL CHANGES AT PITTSBURGH, PA.

At Allegheny Vocational High School, HARRY B. WARNER has been appointed counselor to replace Marius A. Fox, retired.

JOSEPH J. FOYTICK is teaching in the electric shop, during the absence of Herbert Lewis, at Allderdice High School.

JOSEPH R. PROTHEROE is the teacher of the woodshop at the Brookline Elementary School.

LAWRENCE W. ROCKWELL, formerly physical education instructor at Connelley Vocational High School, is now vice-principal of Westinghouse High School.

H. H. HATTMAN is the new safe driving instructor at Connelley Vocational High School.

JOHN P. SEBASTIAN has been made instructor of the new general metals shop at Oliver High School.

JOSEPH H. HEIDRICH transferred to the electric shop at Oliver High School.

CARL TADDEIS has been made instructor of the bake shop at South Vocational High School, and RALPH O. SIMEONE has been appointed teacher of the shoe shop.

EDWARD CANIFF has been made instructor of the metal shop at South Hills High School, and ANDREW S. CHUSKA has been made director of activities.

At Westinghouse High School, ALFRED RITCHEY has been transferred from metal shop to drawing, and HERBERT C. MUELLER has been appointed instructor of the metal shop.

OLAN T. MAHANEY is now teaching the metal and drawing classes at the Gladstone Junior High School.

AL SCHROEDER, Latimer wood shop; HARRY C. HUTCHISON, South Hills School; CURTISS R. CRISS, Connelley Vocational High School; and FRED C. MOORE of Troy Hill School, have retired.

At South Hills High School, EARL C. CLEVELAND is now teaching in the drawing room.

ROBERT FISCHER has been transferred from Westinghouse to South Hills High School in the woodshop.

U. S. Government Films

16MM SOUND MOTION PICTURES AND 35MM FILMSTRIPS

TESTED TRAINING TOOLS

For the school

DIESEL ENGINES

DIESEL LUBRICATION AND COOLING SYSTEMS. 10 min.
Parts of Diesel lubricating and cooling systems and how they work in relation to each other.

DIESEL ENGINE FUEL SYSTEMS 40 min.
Shows the basic structure of Diesel fuel systems, parts and operation of injectors and fuel pumps, and Bosch, General Motors and Excello equipment.

ELECTRICITY

ELEMENTS OF ELECTRICITY 15 min.
Explains the breakdown of a molecule into atoms, and the relation of protons and electrons to electricity.

MICROWAVE OSCILLATORS 18 min.
Explains the magnetron and klystron and the basic theory of operation of each.

OHM'S LAW 19 min.
Explains the elements of electricity; electrical energy, its source, transmission, and use; composition of matter; use of force and energy; how Ohm's law functions; resistance; and the purpose and use of meters.

ENGINEERING

PRINCIPLES OF LUBRICATION 16 min.
The need for lubrication; properties of lubricants; action of lubricants; viscosity of lubricants; and conditions that determine proper viscosity.

These are a few examples of what is probably the world's greatest group of vocational training films. All are 16mm sound, black and white, and low-cost. Many correlated filmstrips are available.

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UNITED WORLD

ASSOCIATION NEWS

(Continued from page 14A)

Directing the conference was Dr. Ralph G. Iverson, head of student personnel services at the college. Presiding were Dr. Verne C. Fryklund, president of Stout, and Dr. John A. Jarvis, dean of the college division of industrial education. — *Dr. T. F. Fleming.*

WESTERN INDUSTRIAL ARTS CLUB OF MINNESOTA

Our Western Industrial Arts Club of Minnesota is having the spring meeting at the new Fergus Falls High School on Saturday, April 3, 1954. We expect 45 high school teachers, our state supervisor, and a few guests.

At the end of our afternoon session we plan to have a drawing for several door prizes that have been donated by companies serving this area. We feel that this will give our new teachers a better chance of becoming acquainted with companies that sell books and supplies. — *Otto E. Ursin.*

♦ On March 13, 1954, was held the seventeenth annual Industrial Education Roundup, a one day meeting which attracted approximately 90 industrial-arts co-ordinators and teachers from the college district at Warrensburg, Mo.

Books from various publishers also were shown. — *N. B. Grinstead.*

THE FEBRUARY MEETING OF THE INDUSTRIAL ARTS ASSOCIATION OF PENNSYLVANIA

The Allegheny County Branch of the Industrial Arts Association of Pennsylvania held its meeting at Brentwood, Pa., on February 24, 1954, with an attendance of 23 commercial exhibitors, and approximately 100 members.

After the dinner the exhibitors displayed their wares and answered questions on requisition needs. In addition, over 30 door prizes were awarded. These ranged from a 10-in. band saw to grinders, vises, hand tools, and books. This meeting gave firsthand information about sources and prices for making out spring requisitions.

TV Committee

The TV committee of our association has been spending long hours in preparation for the ½ hour per week assigned to us by the educational TV station. Over 100 hours of time have been contributed by the committee during the planning stages of our program series. Under the skilled leadership of Don Moon the committee now has outlined details of the first four weeks of programs. Art Taggart, John Barney, Joe Kennedy, Irv Hyman, Jim Griswell, and Ralph Steeb have served on the committee during its various meetings. But we need help. The work has mushroomed to gigantic proportions. Be prepared to be called on to help this TV committee. The series will be of a handyman-home workshop nature and we need guest handymen to show their specialty. What can you do well? A pet hobby? Some shop knack? Your specialty in your shop? Would you be willing to participate on the committee? Do you know someone that can do something well? Be at Sewickley at the next meeting to hear a full report, and offer assistance.

INDUSTRIAL ARTS CLUB OF THE ILLINOIS STATE NORMAL UNIVERSITY

The 1954 Industrial-Arts Roundup to be held at the Illinois State Normal University on Satur-

(Continued on next page)

WATCH OUT, ALFONSO. ONE TUMBLE'S ALL IT TAKES...

In the classroom—as under the "big top"—one slip can ruin an otherwise skillful performance. The experienced instructor wisely minimizes this danger by always insisting upon using time-proved "tools of the trade" like Kester Acid-Core Solder and Kester Plastic Rosin-Core Solder . . . dependable headliners for more than 50 years.

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ASSOCIATION NEWS

(Continued from previous page)

day, May 8, 1954, is planned especially to urge students to enter the project contest sponsored by the Industrial Arts Club of Illinois State Normal University.

Projects in the Junior High School Division, Grades 7, 8, 9, will be in the following subjects: woodwork, metalwork, electricity, crafts — leather, plastics, art metal, other.

The Senior High School Division, Grades 10, 11, 12, will choose from the following subjects: mechanical drafting, woodwork, metalwork, electricity, crafts — leather, plastics, art metal, other.

All projects must be made in industrial-arts classes during the school year of 1953–54.

MASSACHUSETTS INDUSTRIAL EDUCATION SOCIETY SPRING CONVENTION

At a recent meeting of the executive board of the Massachusetts Industrial Education Society, the following officers were elected for the coming year: president, Carl A. Olsen, Jr., Braintree, Mass.; vice-president, Charles Avadanian, Malden, Mass.; secretary, Leo V. Gittzus, Lexington, Mass.; treasurer, John Paltsits, Braintree, Mass.

Members appointed to the executive board for the current year were: education — James J. Hammond, Fitchburg, Mass.; program — Hubert E. Edmonds, Framingham, Mass.; social — Joseph Rains, Boston, Mass.; publicity — Arthur G. Sticklor, Natick, Mass.; library — Edwin L. Frye, Newtonville, Mass.; correspondence — Gerald Antonellis, Stoughton, Mass.; research — Charles J. Chiasson, Brockton, Mass.; past president — Emil E. Keiler, West Newton, Mass.

PROJECT FAIR

The eighth annual spring convention and project fair will be held Saturday, April 3, at Fitchburg, Mass.

All instructors are urged to encourage their students to enter projects so that they may take advantage of the awards offered. The Ford Motor Company will present awards in all the areas and levels of industrial-arts courses. Entry blanks will be sent to all schools in the near future. Start planning now and take part in the "Project Fair" Saturday, April 3, 1954. — *Arthur G. Stickler.*

NEBRASKA INDUSTRIAL ARTS TEACHERS ASSOCIATION CONVENTION

The Nebraska Industrial Arts Teachers Association will hold its annual meeting at Beatrice, Neb., on April 24, 1954.

M. M. Price, dean of men at The Stout Institute, Menomonie, Wis., will be the main speaker on this occasion. His subject will be "Living in and With an Age of Tensions."

Visitors will be taken on a tour through the new Senior High School at Beatrice.

NEW MEXICO INDUSTRIAL ARTS ASSOCIATION MEETING

The New Mexico Industrial Arts Association held its annual meeting during the state teachers convention in Albuquerque, N. Mex., on October 29–30, 1953.

A plan for a state-wide industrial-arts exhibit was outlined and enthusiastically accepted by the shop teachers in attendance. The Industrial Arts Club of Eastern New Mexico University, Portales, N. Mex., is sponsoring the event April 14–17, 1954.

The following officers were named: Worth Long, Washington Junior High School, Albuquerque, N. Mex., chairman; Albert A. Bettina, Eastern New Mexico University, Portales, N. Mex., vice-chairman; and William Forkner, Hobbs High School, Hobbs, N. Mex., treasurer.

OSWEGO ANNUAL SPRING CONFERENCE SET FOR MAY 6–7

The 16th Annual Spring Conference at the State University of New York Teachers College at Oswego, will be held on Thursday and Friday, May 6 and 7. The Conference will be highlighted by addresses from Dr. Joseph R. Strobel, Assistant Commissioner for Instructional Services (vocational education) in the New York State Education Department, and Dr. Leon Mones, Assistant Superintendent of Schools in Newark, N. J. Dr. Mones will deliver the keynote address on Thursday morning and Dr. Strobel will deliver the principal addresses at the Thursday night Epsilon Pi Tau Banquet at the Hotel Pontiac, and at the Friday morning session.

Other significant features of the program include:

Live demonstrations in the latest industrial-arts processes, materials and techniques in all of the college laboratories. Included will be a special Driver Education Demonstration by a Farm Bureau Representative.

Exhibits by industrial-arts suppliers and manufacturers.

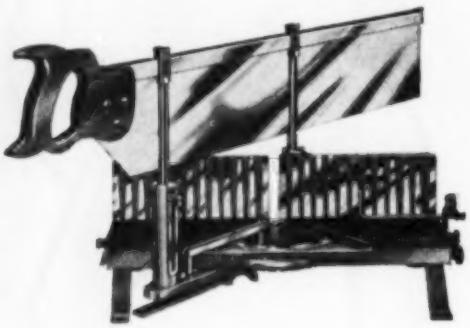
An open house on Friday evening especially designed for the people of the city and the college student.

Epsilon Pi Tau breakfast on Friday morning.

Project exhibit from 150 schools of New York State. This year the exhibit will include an elementary school division. Prizes will be awarded

(Continued on page 22A)

FIRST CHOICE OF PROFESSIONALS — THE WORLD-FAMOUS LANGDON ACME. For hairline accuracy . . . smooth, easy operation . . . and lasting dependability — Millers Falls Langdon Acme has been recognized for years as the world's outstanding mitre box. Today this famous tool is even better. Redesigned with many new and improved features, it is more than ever the finest mitre box you can buy.



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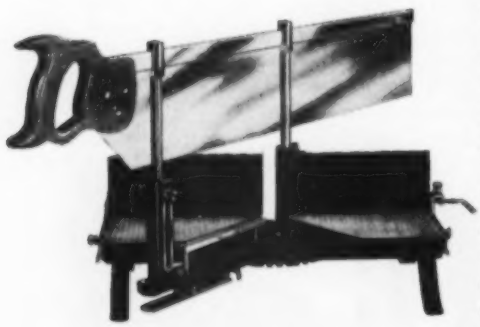

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For Better Work— Equip Your Schoolshop with Millers Falls Mitre Boxes

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The Mark of Superiority

What A-V experts say about Pageant pre-lubrication

"No doubt about it, the Pageant's permanent pre-lubrication *does* reduce wear and damage. There's always adequate lubrication to keep parts from wearing out . . . never an excess of oil to gum up operation."

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United School Equipment Co.
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"In our service experience we have found the single, most important cause for repairs is lack of proper lubrication . . . this causes more money to be spent on a projector after delivery than any other single service cost. We have delivered a considerable number of Kodascope Pageant Projectors and have had none in for service since delivery except for one or two minor adjustments. The reason is obvious—permanent pre-lubrication."

P. Ray Swank
Swank Motion Pictures, Inc.
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"The main problem in the use of 16mm. sound equipment for schools, churches, industry, etc., is maintenance. And the primary maintenance problem has been over- or under-oiling. Because the Pageant eliminates this difficulty, it is becoming the most popular projector in the audio-visual field."

Amedee J. Maserjian
Arax Photographic Company
Poughkeepsie, New York

"The pre-lubrication feature of the Kodascope Pageant Sound Projector catches the eye of the educator and the business executive! Lubrication for life means no fuss, no bother with periodic lubrication!"

Lawrence Logsdon
Texas Educational Aids
Dallas, Texas

In classroom performance—in all-around economy

...only a Pageant offers so much

These days, when you purchase a new projector, the chances are you have to select the one that will make the best showing in your budget—as well as in the classroom.

To assure you of greater value on a smaller budget, only the Pageant—among all 16mm. projectors—offers you all six of these important advantages:

1. Permanent Pre-Lubrication—Pageants are built to last longer—*without maintenance*—than any other projector. How? They are *permanently* lubricated at the factory to eliminate the chief cause of projector breakdowns—over- or under-oiling.

2. Built-in "Field-Sharpening Element"—The curved fields of conventional projection lenses cause either the center or the edges of the picture to be fuzzy. But the Pageant has a built-in "field-sharpening element" to eliminate field curvature . . . and to assure sharp, over-all focus.

3. Sound Focusing—A fixed scanning beam cannot give quality reproduction from all types of 16mm. film because the position of the sound track varies with different types. The Pageant—and *only* the Pageant—has a built-in Fidelity Control that lets you precisely focus the scanning beam for crisp, clear sound from both originals and "dupes."

4. Optimum Sound . . . Anywhere—Clear, adequate and *comfortable* sound—evenly distributed throughout the room—is no problem with a Pageant. This is because rated wattage represents *deliverable* power, honestly available under actual conditions . . . because the speaker has ample capacity for the amplifier . . . and because *matched* auxiliary speakers are available for acoustically difficult locations.

5. Permanent Quietness—The Pageant has many unique features—such as nylon gears and a non-skip pulldown mechanism—to make it outstandingly quiet. And pre-lubrication makes noiseless operation a *permanent* feature.

6. Lowest Priced in Its Class—The Kodascope Pageant Sound Projector, Model 1, shown above, is priced at an amazingly low $375. And the other models in the complete Pageant line are also priced below all other comparable projectors.

See your Kodak Audio-Visual Dealer soon for a free demonstration—or mail the handy coupon for full details.

Price subject to change without notice.

A Pageant Model for every 16mm. need

Whatever your acoustical or room-darkening problems, there is a Pageant specially tailored to your individual requirements: the Model 1 for average sound and silent showings . . . the super-brilliant Pageant AV-071 for hard-to-darken locations . . . the two-case Pageants AV-151 and AV-151-E for extra power, speaker capacity, and tone control . . . the Models AV-151-S and AV-151-SE for extra power in single, easy-to-carry cases. Also the Kodascope Analyst Projector for critical study of 16mm. sport and other silent films . . . and the Eastman Model 25 for theater-type installations.

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Send name of nearest Kodak Audio-Visual Dealer . . . information on projectors checked:

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☐ *Kodascope Analyst* ☐ *Eastman 16mm. Projector, Model 25*
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ASSOCIATION NEWS

(Continued from page 20A)

in each division and each student entering a project will receive a special award certificate.

Music by various members of the student body and faculty under the direction of the Head of the college music department, Dr. Maurice Boyd.

Informal programs at luncheons on both Thursday and Friday, including prizes from the "Deck Officer."

A most cordial invitation is presented to administrators, teachers, groups of high school seniors and other interested persons throughout the nation to come and share the professional and social benefits of this fine program.

WEST TEXAS INDUSTRIAL-EDUCATION ASSOCIATION MEETING

The West Texas Industrial Education Association held a meeting on the campus of Sul Ross State College, Alpine, Tex., on the evening of February 26 and Saturday morning, February 27. Teachers, administrators, and their wives were guests of the industrial education department and the College.

Dr. DeWitt Hunt, editor of the "Industrial Arts Teacher," and head, School of Industrial Arts Education and Engineering Shopwork, Oklahoma A & M College, was the consultant and speaker. Demonstrations of shop techniques by students included "use of the clamp nail," and "enriching projects with *flock*."

An informal get-together was held for the ladies in the home of Professor Delbert Dyke, head of the department at Sul Ross, on Friday evening, and an interesting demonstration by the home economics majors on "Short Cuts in Sewing" on Saturday morning.

CALIFORNIA INDUSTRIAL EDUCATION ASSOCIATION CONVENTION

A large group of California industrial education teachers gathered at Fresno, Calif., on March 12 and 13 for the 32nd annual convention. Hosts of the meeting were the shop teachers of San Joaquin area.

Program features were the convention banquets, conference speakers, and the numerous machinery displays. A noteworhty exhibit was the display of industrial-arts projects at Fresno State College.

C.I.E.A. is composed of six major sections representing the entire state. Each section is further divided into three to 15 locals. Last year's meeting in Santa Barbara drew a registration of over 1400 industrial-arts teachers from the entire state.

The local convention committee was headed by James E. Welden, Fresno, and Marion Grosse of Fresno State College, associate chairman.

WISCONSIN BUILDERS CONFERENCE

With construction personnel from Minnesota, Iowa, Illinois, and Wisconsin in attendance, Stout Institute conducted the Wisconsin Builders Conference on its campus, January 25–26. A special group of Canadian builders also attended.

Taking part were over 100 building contractors, teachers of vocational and industrial education, directors of vocational programs, retail lumber suppliers, research experts on building, trade union executives, union members, and students enrolled in vocational education programs.

Aim of the conference was to direct the attention of men in the construction trades toward current trends and developments in building materials and methods. Specialists from the building

(Continued on page 24A)

WATCH

for the WINNERS of the DEK-TUFTS Original Projects Contest

in the May Issue of Industrial Arts and Vocational Education

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(This text deals with residential installation; commercial & industrial installation is being prepared for later publication.)

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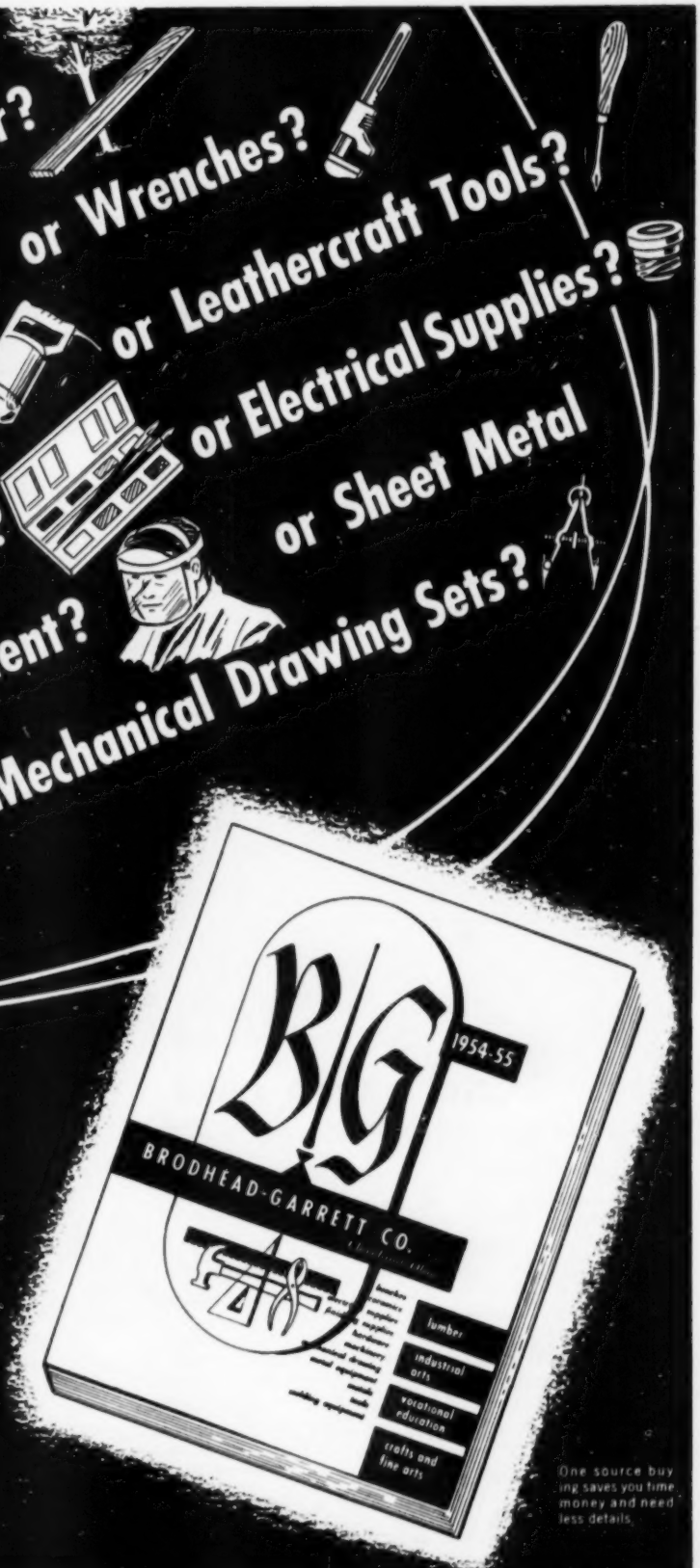

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"EVERYTHING IN INDUSTRIAL ARTS SUPPLIES"

ASSOCIATION NEWS

(Continued from page 22A)

fields gave addresses and conducted sectional meetings.

Following registration at 9 a.m. on Monday, January 25, in the Stout gymnasium, delegates attended a general session conducted by K. T. Olsen, associate professor of industrial education at Stout and chairman of the conference.

Prior to the main address, the visitors were welcomed by Dr. Verne C. Fryklund, president of Stout, and Dr. John A. Jarvis, dean of industrial education at the college.

Keynote address for the conference was delivered by Griffith S. Clark, representative of the Homasote company and specialist in techniques of modular construction. He spoke on "Recent Building Trends."

After visiting the exhibits put up by the manufacturers and distributors of building products, the group again assembled under the chairmanship of K. T. Olsen to hear R. F. Luxford, building expert from Forest Products Laboratory, discuss the problem, "Are Present Wall Constructions Structurally Sound?"

As a research engineer for the Forest Products Laboratory, Luxford and members of his staff have completed a series of experiments testing present procedures in wall construction. Data from these widely discussed experiments were made public in Luxford's presentation.

Conference participants also were given the latest information on insulation. Then Stout Institute students conducted a demonstration of framing methods. A tour of college shops and laboratories completed Monday afternoon's program.

In the evening residents of the Menomonie area had the opportunity to attend an open house conducted in the Stout gymnasium from 7:30 to 9:00 p.m. Leading suppliers exhibited construction, building materials, building equipment, hand tools, power tools, patented window units, insulation, outside wall covering materials, etc.

Company representatives, who personally conducted their firms' exhibits, welcomed inquiries from the public at any time during the exhibition.

At 9:45 a.m., on Thursday, Griffith Clark addressed a sectional group, on the subject of modular construction principles.

Thursday afternoon's session featured a panel discussion on innovations in the finishing of surfaces encountered in building. George Soderberg, assistant professor of industrial education at Stout, and chairman of the panel, spoke on "Beautifying and Protecting Wood Surfaces."

Edwin H. Nixon, representative of the United States Gypsum Company, described "Wall Construction: Dry Wall, Plaster and Insulation Boards."

Concluding the afternoon's sectional meeting was a talk on "Recent Developments in Exterior and Interior Paints," by James Porter, chemist in the laboratories of Minnesota Paints, Inc.

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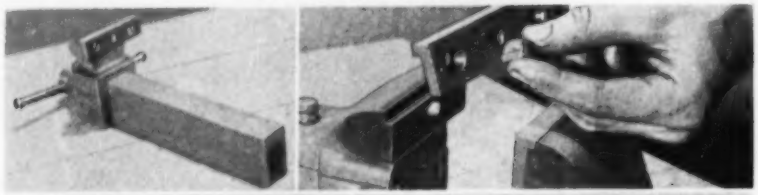

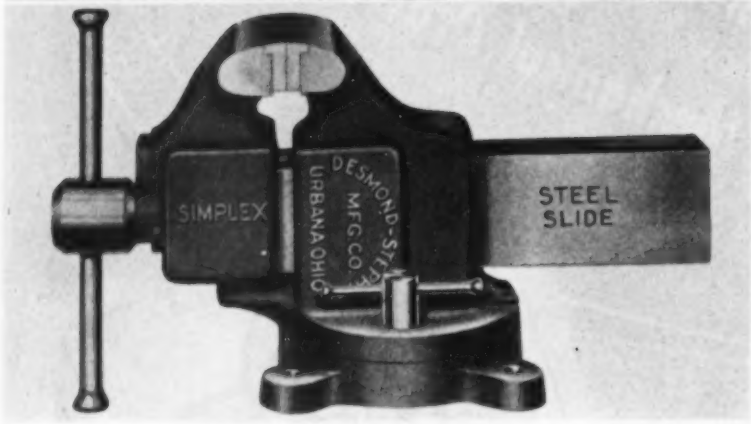

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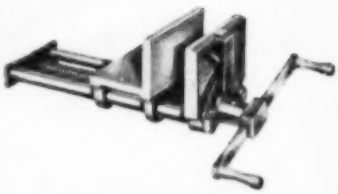

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SHORT METHOD OF AVERAGING GRADES

D. R. SHERMAN
Department of Industrial Teacher Education
Wayne University
Detroit, Mich.

As a drawing instructor constantly faced with the averaging of plate grades, I often wondered whether or not some short cut might not help eliminate this tedious chore. Through an adaptation of the method for statistically calculating the arithmetic mean, it is possible to average grades simply and easily and without the use of any machine. This method represents nothing new, for it is just an extension of statistical principles that are already known. For myself, I can say that this is the simplest and quickest method that I ever used, and I found that it would work equally well whether the grades were of the numerical variety (95, 86, 79) or of the letter variety (A, B, C, D). Let us first see how an average may be quickly calculated with a group of numerical grades.

Please refer to example 1. Upon examination of this illustration, you will see that there is a horizontal listing of grades — much the same as you might find in your class book or grading sheet. If we were to average these grades in the traditional fashion, the first step would be to list all the figures vertically, add them up, and, finally, divide by the number of items. This whole approach is shown in example 1.

On referring to example 2 you will find the same listing of grades as in example 1. The steps to obtain this quick average are as follows:

1. Look at the entire list of figures and

(Continued on page 27A)

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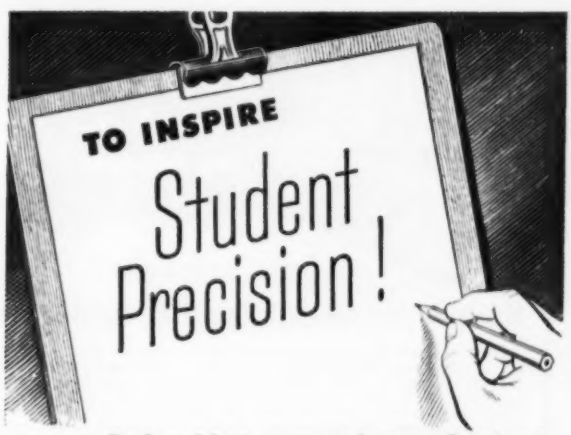

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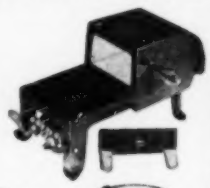
No. 101 Bench Furnace



Delivers up to 1800° F. without a blower. Powerful, efficient and economical. For heating soldering coppers up to 12 lbs. per pair. Ideal for heat treating, case hardening, and annealing carbon steels. Two burners. Firebox 3¾x4½x5½. Complete with work rest block and baffle plate.

$20.80 F.O.B. Factory

No. 118 Combination Furnace

Use this furnace for heat treating carbon steels and for melting soft metals such as lead, tin, zinc, babbitt, etc. Lid on hood may be removed and 22 lb. melting pot inserted. Firebox 6¼x5x6½. Complete with pot as illustrated.

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B

AVERAGING GRADES

(Continued from page 24A)

EXAMPLE 1. The Traditional Method of Averaging Grades

(These grades represent a class book listing): 92, 90, 88, 87, 95, 94, 96, 92, 88, 87, 91, 93, 94, 88, 90, 85

1st step:

92	
90	
88	
87	
95	
94	
96	
92	
88	
87	
91	
93	
94	
88	
90	
85	
1450	

2nd step:

90.625
16)1450.000
144
100
96
40
32
80
80

make a guess as to the approximate average. With a little practice, you will be able to get surprisingly close. One other point, your guessed average should always be a whole number such as 90, 87, 76, etc. This will make your mental calculations easier. In this case, let us say, your guess is 90.

2. The next step is to obtain the "calculated difference." This is done by subtracting 90 (the guessed average) from each grade in the listing. Do this mentally and keep a running total in your head. In the example, 90 is subtracted from 92 leaving a difference of +2; then, 90 is subtracted from 90 giving 0, but at this point we must add the previous total, +2, so the running total at this point is +2. 90 from 88 yields a −2 which when added to the previous running total of +2 gives us a new running total of 0. This procedure is continued until the guessed average has been subtracted from each item. The resultant running total, the calculated difference, is, in this case, +10.

3. The next step is to set up the correction lated difference." This is done by subtracting calculated difference over the number of items — in this case 10/16 or .625. The correct average, then, becomes our guessed average (90), plus the correction factor (.625) or 90.625. If your guessed average is higher than the correct average (in this case, ours was low), the calculated difference will be negative, rather than positive as was true in this case, so the correction factor will be subtracted from the guessed average rather than added to it.

This method works equally well with letter grades. In application, much the same procedure is followed that is employed in determining honor point averages in college. This is done by replacing the letter grade with an equivalent numerical value. Thus the *A* is equivalent to 4, the *B* to 3, the *C* to 2, the *D* to 1, and the *E* or *F* to 0. To make your task much simpler, don't jot down the letter grade *A* in your class book or grading sheet, but write down its equivalent, 4, instead. This will save an extra step. Example 3 shows a set of numerical grades that are equivalent to a set of letter grades.

To calculate the average from the letter grade listing:

1. Convert the letter grades to their numerical equivalents.

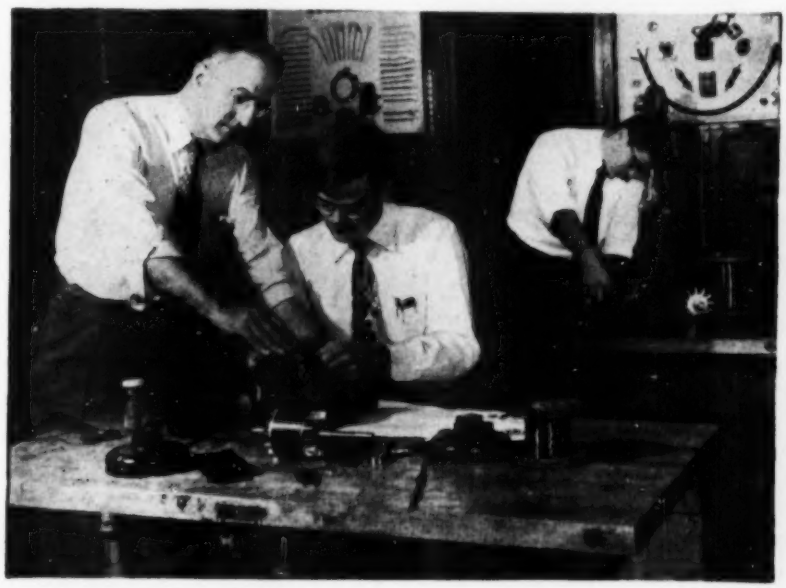
2. Find the guessed average, the calculated difference, and the correction factor. In short, proceed as explained in previous illustrations for numerical grades.

If it should be necessary to reconvert the numerical averages into letter grades, it is a simple matter to use a table like the one

EXAMPLE 3. How Numerical Grades Can Represent Letter Grades

This set of numerical grades: 4, 3, 2, 4, 2, 4, 4, 3, 3, 4, 4, 2, 2, 4, 2, 3, 3 is equivalent to this set of letter grades: A, B, C, A, C, A, A, B, B, A, A, C, C, A, C, B, B,

(Continued on next page)



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For more information about G-E motor and generator construction kits contact your nearest G-E Apparatus Sales Office or write for Bulletin GEC-675 to General Electric Co., Sect. 688-3, Schenectady, N.Y.

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GENERAL ELECTRIC

AVERAGING GRADES

(Continued from previous page)

shown in example 4. This table is essentially the same as the one used in making honor point calculations. One other point should probably be mentioned here. If you are accustomed to using the minus and plus system (A—, B, B—, etc.), you can still use this system to calculate averages — only fractions in your head (example 2, part 3), the only numbers you'll ever write down will be the answers. Although the method seems a little awkward at first, it is very easy to use; so simple, in fact, that many of your high school students will be able to learn it and apply it. The short time that you'll spend to become proficient in this procedure will be amply repaid the very first time you sit down to figure out class averages, and once you use it, you will be able to see for yourself how practical it really is.

EXAMPLE 2. The Short Method of Averaging Grades

(The same listing of grades as shown in example 1): 92, 90, 88, 87, 95, 94, 96, 92, 88, 87, 91, 93, 94, 88, 90, 85

To get the average:

1. Make a guess as to the average. A good one here is 90.
2. Get the "calculated difference" or running total.

	92		90	88	87	95
Subtract the guessed average from each grade	90		90	90	90	90
	+2	←PLUS→	0	−2	−3	+5
Get the running total			↓ +2	←PLUS→ ↓ 0	←PLUS→ ↓ −3	←PLUS→ ↓ +2

(The final total is +10.)

In Actual Practice This Entire Step Is Done Mentally.

3. Get the correction factor and the average.

$$\text{Correction factor} = \frac{\text{Calc. Diff. or Running Total}}{\text{No. of Items}} = \frac{+10}{16} = .625$$

$$\text{The correct average} = \text{Guessed Average} + \text{Correction Factor}$$
$$= 90 + .625$$
$$= 90.625$$

This Step Is Also Done Mentally.

EXAMPLE 4. A Table Showing the Letter Grade Equivalencies of a Calculated Average

A	3.5–4.0
B	2.5–3.49
C	1.5–2.49
D	0.5–1.49
E or F	0.0–0.49

EXAMPLE 5. A Table Showing the Equivalencies (Numerical) of Letter Grades Where the Minus and Plus Features Are Desired

A	11
A—	10
B+	9
B	8
B—	7
C+	6
C	5
C—	4
D+	3
D	2
D—	1
E or F	0

the equivalency value of the grades is different. See example 5.

With a little practice, you will find that you are able to average a row of grades in from 10 to 30 seconds, and, if you can do

News Notes

♦ A nationwide competition to select winners of fifty fellowships to a special six-week Summer Program for Science Teachers from high and preparatory schools was opened by the Massachusetts Institute of Technology.

The winners will be at M.I.T. from June 28 to August 6, 1954, to hear members of the Institute's faculty review the basic sciences of physics and chemistry and present glimpses into many new scientific frontiers.

The fellowships to this Program are made possible by a special grant of the Westinghouse Educational Foundation. They will be given to experienced science teachers from the United States and Canada who hold college degrees or who have had substantially equivalent training and background.

The course will provide a review of fundamental subject matter in physics and chemistry, together with a survey of recent scientific developments in physics, chemistry, biology, meteorology, geology, and aeronautical engineering.

There will be 15 lectures in physics and 15 in chemistry together with numerous experiments and demonstrations.

Dr. Arthur R. Davis, associate professor of inorganic chemistry, is chairman of the M.I.T. faculty committee in charge of this year's program.

Members of the Science Teachers Program may live in M.I.T. dormitories and will be invited to make full use of M.I.T.'s laboratories and dining and recreational facilities. Registration for the Program will be limited to fifty, corresponding to the number of grants provided by the Westinghouse Educational Foundation. Applications are due before April 1, 1954, on blanks which may be obtained from the M.I.T. Summer Session Office, Room 7-103, Cambridge 39, Mass.

♦ Wayne University's College of Education again approves credit for the European Study Tour in Comparative Education. Personally conducted by Professor Wm. Reitz, this Seventh Annual Tour will leave New York June 19 and will return August 31. Covering ten countries in ten weeks, the 1954 tour will feature a two weeks' visit to Spain.

Qualified persons may earn up to eight hours of graduate or undergraduate credit. Similar credit arrangements are available through Mercy College, Detroit. Further details may be obtained from Dr. Wm. Reitz, Wayne University, Detroit 1, Mich.

♦ An opportunity for a deserving high school graduate to obtain a one-year, tuition-free scholarship in photography at the famous Rochester Institute of Technology was announced by the Photographic Society of America.

Any youth anywhere graduated from high school no longer than two years ago and who is able to demonstrate a satisfactory interest in photography and meet certain basic scholastic, character, and aptitude requirements may become a candidate for the scholarship.

Applications for the scholarship are to be sent by mail to the headquarters of the *Photographic Society of America, 2005 Walnut Street, Philadelphia, Pa.*, and must be postmarked no later than May 15, 1954, to receive consideration.

♦ The new Schulte Catholic High School of Terre Haute, Ind., opened its doors for the first time this fall. Industrial arts is a strong part of the curriculum. Provision has been made for a separate drawing room and a second room for general shop. The general shop has been equipped for the areas of electricity, metal, printing, and wood. Joe Frisz and Emanuel Fusco, recent graduates of Indiana State, are the instructors.

♦ "Showmanship in Safety" — the National Safety Council's new book of attention-getting stunts, contains in one package the best in safety promotion ideas.

Loaded with schemes that help sell safety to workers in new and appealing ways, the book serves well for any accident prevention program.

The book contains more than 150 ideas for displays, demonstrations, stunts, awards, and other interest-arousing devices.

The book tells how to add sparkle to safety meetings, how to sell employees on wearing protective equipment and gives many other assists to the safety man in putting across his program.

The book is illustrated with cartoons and bound in a two-color heavy paper cover. It sells for $1.25 to Council members and double that price to nonmembers. For further information and quantity prices write the *National Safety Council, 425 North Michigan Ave., Chicago 11, Ill.*

♦ "The Bounty of the Forest," is a full-color documentary movie which covers the story of lumber from its growth through its end uses.

During the first nine months of showing, the movie was shown about 1500 times before live and television audiences.

The film is available for loan to responsible individuals for showings before retail and wholesale lumber groups, sales meetings, school, civic, service, church, and similar gatherings.

Prints may be obtained by writing *Western Pine Association, Yeon Bldg., Portland 4, Ore.*

♦ The first degree ever offered in technical drawing was awarded at Illinois Institute of Technology's midyear commencement Saturday, January 30.

Recipient of the degree was Theodore Dolan, 3500 N. Fremont St., Chicago, who also received

(Continued on page 30A)

"*Girls** Keep Up With Boys Because **DELTA** Tools are so Safe and Easy to Operate."

At Shortridge High School, Indianapolis, Indiana, the girls learn shopwork right along with the boys, quickly, and with award-winning skill. The speed with which these students learn is attributed to the safety and ease of operation of the several DELTA Power Tools in the Shortridge High School Shop.

"No Added Safety Devices Needed To Teach *Blind* Students With **DELTA** Power Tools."

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NEWS NOTES

(Continued from page 28A)

a B.S. degree in mechanical engineering from Illinois Tech in 1950.

An instructor of engineering drawing at the University of Illinois branch in Chicago, Dolan now starts to work on his M.S. in engineering graphics.

♦ The first authoritative manual of information on the nation's rehabilitation centers has been published by the National Society for Crippled Children and Adults, 11 South La Salle St., Chicago 3, Ill.

"Rehabilitation Centers in the United States," one of the most useful recent publications in the field of service for the crippled, grew out of the First National Conference on Rehabilitation Centers jointly sponsored by the National Society and the Office of Vocational Rehabilitation of the U. S. Department of Health, Education, and Welfare.

The volume contains descriptions and statistics on every phase of rehabilitation procedure. It is available at $1.50 per copy from the headquarters of the *National Society, 11 South La Salle St., Chicago 3, Ill.*

♦ The National Safety Council's new series of human relation training films for foremen is now available.

Featuring O'Grady, the safety skeptic from the Council's film, "A Gray Day for O'Grady," this three-film set tells how a foreman learns about people.

"Fragile — Handle Feelings with Care" shows how a foreman learns to value and respect the feelings of his workers.

"Call 'Em on the Carpet" shows the various methods foremen can employ to correct worker's faults without incurring ill will.

"It's an Order" is a humorous film illustrating how supervisors should give orders so that they are understandable and can be carried out efficiently by the worker.

Prepared under the supervision of the Council's industrial department, the films run 12 minutes each and are available in 16mm. sound movies as well as 35mm. sound slidefilms.

For further information and prices write the *National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.*

♦ The board of education at Barbourville, Ky., permitted Walter Messer, instructor of building trades at the high school, to supervise the 36 students in his class to construct a 20 by 140-ft. shop building.

The structure is of metal paneling with inside walls of tempered masonite. It is equipped with a bench saw, band saw, 12-in. planer, jointer, jig saw, and several lathes. The shop also is equipped with the customary small tools.

VIRGINIA HAS MOBILE ART MUSEUM

The state of Virginia has a unique plan to exhibit and interpret art objects throughout the state by means of the "Artmobile."

The "Artmobile" is a specially designed 45-foot aluminum trailer with a body which has been especially created for the purpose. The 32 by 7-ft. interior is fitted with museum-type walls to which may be attached paintings or other original art objects. It is illuminated by built-in ceiling units. The displays will be shown in town squares, school or church yards, on roped-off streets — in fact anywhere that can best serve Virginia communities.

The displays on the Artmobile will be changed after each state-wide circuit. Included will be exhibitions of paintings, sculpture, architecture, decorative arts, industrial, landscape, and interior design, town planning, etc. The opening exhibit is composed of paintings by the "Little Masters" of the Netherland and Belgium, loaned by Walter P. Chrysler, Jr.

The equipment of the Artmobile can function wherever it has access to a three-wire, 220 volt power line, which furnishes electricity to run the Artmobile's burglar alarm system as well as for control of temperature (held to 70 degrees with relative humidity of 35 to 50 per cent), lighting, and sound systems for lectures and background music. Fire protection is provided by a carbon dioxide installation.

The driver is the sole operator of the entire unit and curator of the Museum. During exhibition hours he takes up his post in the information booth from where he, by means of a small window, has a view of everything but the rear walls.

♦ The sponsor of the Hallmark Hall of Fame, network radio and television dramatic programs, is offering junior and senior high school students throughout the nation an opportunity to win cash prizes totaling $3,500 in an essay contest.

Hallmark Cards, Inc., is offering 116 prizes, plus 16 awards for the winners' schools, for the best 100-word essays beginning: "I nominate for the Hallmark Hall of Fame . . ."

Designed to increase the interest of juvenile audiences in the shows, which dramatize the lives of great figures in history or contemporary life, the essays must nominate a person "who has contributed, in some way, to making this a better world."

The contest is open to children of the seventh through the twelfth grades in school. Entries close on Sunday, March 29, after which judging will be conducted by representatives of Hallmark cards, scholastic magazines, and several nationally known educators.

The Hallmark Hall of Fame programs are presented Sundays on the NBC television network at 5 p.m., and the CBS radio network at 9 p.m. with Sarah Churchill starring on the TV show and Lionel Barrymore on the radio program.

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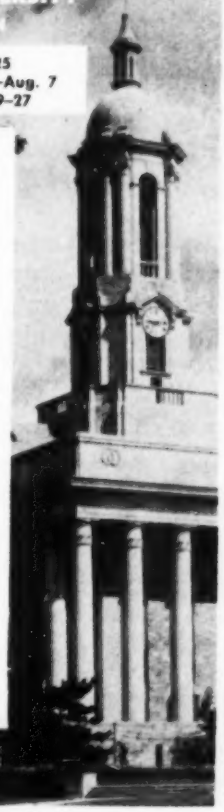

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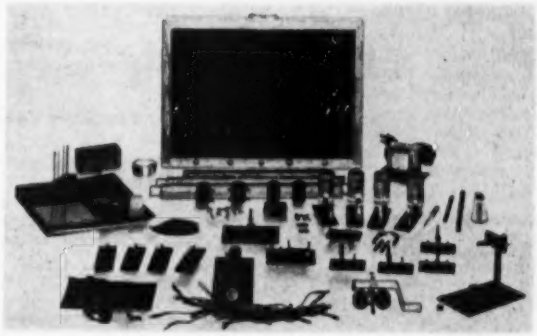

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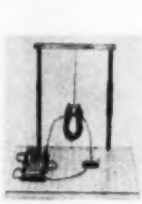
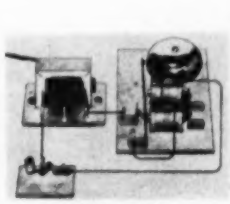
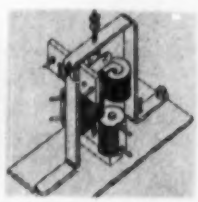


Electro-Magnet Experiment



Bell Assembly and Circuit



Sketch of AC Motor Assembly

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New Publications

How Children Learn to Write

By Helen K. Mackintosh and Wilhelmina Hill. Office of Education Bulletin 1953, No. 2, 24 pp., 15 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

How Children Learn to Write shows that the development of written expression is a continuous process which has a simple beginning with young children. During each year of their elementary school lives, children add new skills and further develop those they already possess. In this bulletin the illustrations stress the close relationship of spelling, handwriting, and the expression of ideas in written form.

Woodworking for the Home Craftsman

By Emanuele Stieri. Paper, 376 pp., 5 by 8 in., illus., $1.50. Barnes & Noble, Inc., New York, N. Y.

This is a good book for the home craftsman who wants to make repairs in his house, learn to use the ordinary carpenter's hand and power tools, and gain some knowledge of the materials used by the woodworker.

The 15 chapters contain information about wood and wood products; the use of hand tools; joints, fasteners, and glues; power machines such as the circular saw, lathe, band saw, jig saw, drill press, jointer, shaper, sander; paints and other finishes; selection and care of painting tools and equipment; and fixing up the home workshop.

There also are directions for making a number of pieces of indoor and outdoor furniture.

Applied Drawing and Sketching

By Joseph W. Fleming, Dewey F. Barich, and L. C. Smith. Paper cover, 150 pp., 8¼ by 10⅞ in., illus., $2. Cloth, $3.50. American Technical Society, Chicago, Ill.

This is a revised edition of this helpful and useful text on drawing and sketching. The problems presented for student execution are interesting and well selected, and the explanations accompanying them are brief and to the point.

The subjects covered are pictorial drawings, lettering, making working drawings, sheet-metal drawings, and reading machine shop, electrical, and building trades blueprints.

Each drawing plate is accompanied by questions and there are several glossaries interspersed throughout the books.

Teaching Vocational Agriculture

By E. W. Garris. Cloth, 393 pp., 6¼ by 9¼ in., $6.50. McGraw-Hill Book Co. Inc., New York, N. Y.

A very fine book in which the author discusses the development of agricultural and vocational education, analyzes the duties and responsibilities of agricultural teachers, and describes how to plan the various types of agricultural school, laboratory, and farm buildings. It helps to plan or make the necessary preliminary surveys; organize the courses of study; select the teaching force; supervise the preparation of visual-aids and farm projects; plan summer work and professional improvement; establish good public relations; and evaluate vocational agricultural programs.

Modern Woodworking Projects

By J. S. Turnbull. Paper, 122 pp., 8¼ by 11 in., illus. The Macmillan Co., New York City.

This book contains step-by-step directions for making 11 interesting projects that can be readily made by using hand tools only; nine projects that require a lathe for turning; directions for making square, rectangular, and round lamp shades; instructions for making models of cruisers and speed boats.

Then there are 16 excellent projects that can best be made on power woodworking machinery.

There also are three group production projects that will be found useful in the school or home workshop.

The appendix gives directions for shop organization, grading, and the dispensing of nails, screws, and other materials.

The description of how to perform the various woodworking tool operations accompany the directions given for making the various projects.

The book is profusely illustrated.

Farm Arc Welding

By V. J. Morford. Cloth, 456 pp., 6 by 8⅞ in., illus., $2. The James F. Lincoln Arc Welding Foundation, Cleveland 17, Ohio.

An exceedingly helpful book for the progressive farmer. It is more than a book on welding, because it contains many fine working drawings which the farmer who knows how to weld can use in making things that will take the back breaking drudgery out of farm work.

The book is divided into three parts. Part I is on how to weld. Part II presents hundreds of useful suggestions for making repairs, alterations, and pieces of equipment for use in the fields, the home, and the barns.

Part III contains a number of tables that will be found very useful.

Motor Service's New Automotive Encyclopedia

By William K. Toboldt and Jud Purvis. Cloth, 766 pp., 6½ by 9¼ in., illus., $7.95. The Goodheart-Wilcox Co., Inc., Chicago, Ill.

(Continued on page 35A)

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(Continued from page 32A)

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A Directory of 2660 16mm. Film Libraries

By Seerley Reid and Anita Carpenter. Office of Education Bulletin 1953, No. 7. 172 pp., 50 cents. For sale by the Superintendent of Documents, U. S. Government Printing Office, Washington 25, D. C.

This directory is a State-by-State and city-by-city list of sources from which 16mm. films can be borrowed or rented. It includes libraries which handle entertainment films and those which handle instructional films. Listed are libraries which have only one film and libraries which have thousands of films. The directory includes also commercial dealers, colleges and universities, city and state school systems, public libraries, industrial companies and trade associations, labor unions, civic groups, religious institutions, and government agencies.

This *Directory* will be helpful to teachers, school administrators, librarians, community leaders, and others who use or may wish to use motion pictures in their educational and informational programs.

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SHOP EQUIPMENT NEWS

STANLEY WEDGE VISE

Featuring big holding power at a low cost for Mr. Fix-it and workshop fans, the wedge vise (No. 1240) now marketed by Stanley Tools fastens to any bench in seconds by means of three screws. Built for rugged work, the vise consists of a heavy gauge steel wedge-shaped base and a hard maple block with a "hooked" end for wedging stock into working position. Its simplicity and strength provide a quick easy set-up for sawing, planing, shaving, chiseling, driving screws, drilling. It may be screwed to a board for work on storm sash, screens, doors. Holds paper-thin stock and up to two and one-half inches in thickness. Packed in individual cartons.

Stanley Wedge Vise

For further information write to *Stanley Tools, New Britain, Conn.*

(For Convenience Circle Index Code 0401)

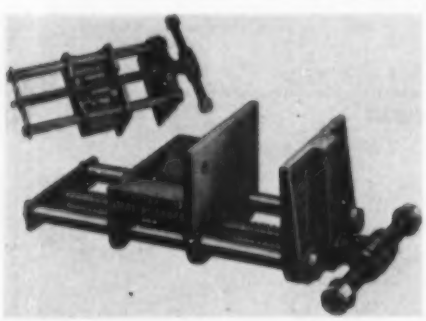
THE NEW NO. 18-A MORGAN WOODWORKING VISE

The Morgan Vise Company of Chicago announces the development of a new dual purpose woodworking vise. The new Model No. 18-A incorporates the advantages of the quick action vise with the smooth operation of the continuous screw type. The vise jaw may be pushed up to the work and a simple turn of the handle tightens the jaw against the work.

The No. 18-A vise will be of particular interest to school shop instructors, pattern shops, or any other operations using woodworking vises.

The vise screw has a continuous buttress thread. It is made of cold rolled steel. All castings are semisteel and machined to very close tolerances.

The jaws are 7 in. wide, 4 in. deep, and open to 9 in. For extra convenience and utility the No. 18-A vise has an adjustable stop built into the front jaw. Each unit weighs approximately 25 lb., and is packed in individual heavy cartons for easy storing and shipping. For additional information write to the *Morgan Vise Co., 108 N. Jefferson St., Chicago, Ill.*



No. 18-A Morgan Woodworking Vise

(For Convenience Circle Index Code 0402)

NEW TOLERTON DRAFTING OR ART TABLE

The Tolerton Company, Alliance, Ohio, announces the addition of a new drafting or art table to their line of Tolco Precision Built Industrial Arts Equipment. The new model to be known as Model TD-6 is constructed of select northern, hard maple. Both the adjustable and stationary sections of the top are laminated from narrow strips of northern, hard maple electronically glued by the famous Tolco method. Basswood or high pressure plastic laminated tops can also be furnished on the TD-6 Model.

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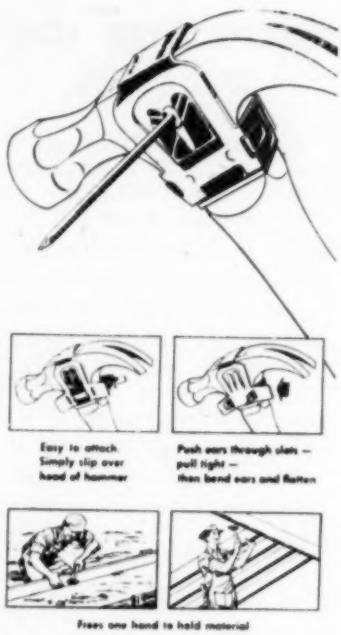
For additional information write to *The Tolerton Co., P.O. Box AA 658, Alliance, Ohio.*

(For Convenience Circle Index Code 0403)

THIRD HAND NAIL CLIP

The "Third Hand" nail clip is now being made and distributed by the Utica Drop Forge and Tool Corporation. This *third hand* is easily and quickly attached to most carpenter's hammers —its spring-steel clip holding all nails from shingle nails to spikes.


Easy to attach. Simply slip over head of hammer
Push ears through slots — pull tight — then bend ears and flatten
Frees one hand to hold material

Utica **Third Hand** Nail Clip

Use of the Utica *third hand* greatly simplifies starting nails, as the material can be held in position with one hand while the nail is started with the other hand. When the nail is started, a slight pull frees the hammer which then completes driving the nail in the usual manner.

The *third hand* also gives extra reach when starting nails, often saving the use of stepladder or scaffolding.

This gadget is never in the way as it fits very closely against the hammer head. It retails at 79 cents.

For further information write to *Utica Drop Forge and Tool Corp., Utica 4, N. Y.*

(For Convenience Circle Index Code 0404)

NEW SERIES OF NIAGARA OPEN BACK INCLINABLE PRESSES

Just introduced is the new line of Niagara Open Back Inclinable Presses — Series AA.

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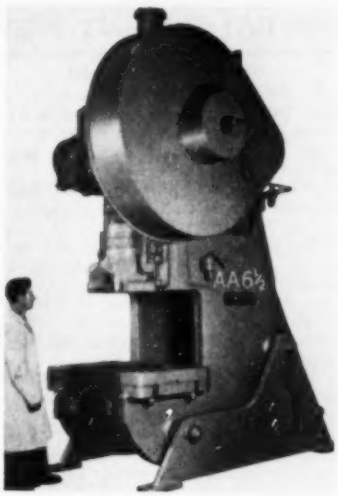


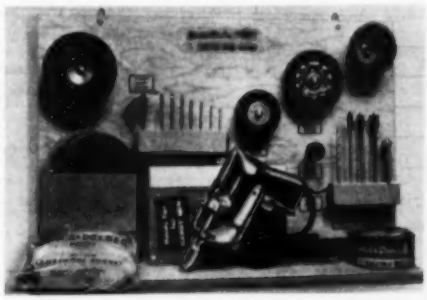
New Niagara Open Back Inclinable Press

be obtained by requesting Bulletin 57-A from *Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.*

(For Convenience Circle Index Code 0405)

NEW POWER TOOL SHOP HANGS ON WORKSHOP WALL

A new ¼-in. Electric Drill Board that holds 23 basic accessories for "do-it-yourself" enthusiasts has been introduced by The Black & Decker Mfg. Co., Towson, Md.



Compact Electric Workshop Hangs on Wall

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(Continued on next page)

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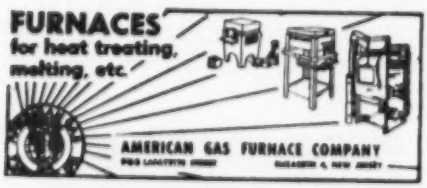

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SHOP EQUIPMENT NEWS

(Continued from previous page)

the wall. The compact unit also can be carried to other job locations when desired. Correct holders for each item keep them in order and are generously spaced to make any item instantly removable for use.

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The Drill Board is designed to help home handymen keep their workshops neat and to facilitate efficient operation.

For further information write to the *Black and Decker Mfg. Co., Towson 4, Md.*

(For Convenience Circle Index Code 0406)

Descriptive Material

NEW BOOKLET ON FLAME CUTTING FOR WELDMENTS

A new 12-page booklet entitled, "Advanced Automatic Flame Cutting for Machinery Weldments," is being offered by Air Reduction.

Reprinted from *The Welding Journal*, this article relates how the Marion Power Shovels Company converted from castings and riveted structures to weldments. It tells how, using the electronic tracer, to improve flame-cutting flexibility and increase production capacity while reducing the cost of flame-cut parts and steel plate items for these weldments.

Request a copy of this article by writing to *Air Reduction Sales Company, 60 East 42nd Street, New York 17, N. Y.*

(For Convenience Circle Index Code 0407)

BULLETIN ON VERTICAL TYPE MUFFLE FURNACE

The ATMOTROL vertical type muffle furnaces are described in a new bulletin just released by Surface Combustion Corporation, Toledo, Ohio.

Bulletin SC-165 includes a detail construction drawing, depicting important design features, photographs of typical applications with types of parts being heat treated, and descriptions of accompanying equipment — controlled cooling pits and prepared atmosphere generators. Handy data and charts on the application of RX atmospheres to heat-treat processing are also included.

For your copy of this bulletin write to *Advertising Department, Surface Combustion Corp., Toledo 1, Ohio.*

(For Convenience Circle Index Code 0408)

(Continued on page 40A)

METAL CRAFTS
Tools, Materials and Supplies

- Hammers, anvils, enamels, etching materials, books and findings.

Send 50¢ for our new catalog 1A. Payment credited on first $3.00 order.

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Cut-away view showing how heating element completely covers sides and bottom of pot to maintain even heat distribution at low wattage.

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is practical and economical for school shop and home use. Teach the boys what good glue can do by heating it in Sta-Warm electric glue pots. Cap. 1 to 12 qts. 110 V. A.C. Safe non-burning electric heat. Removable insert with ball brush-wiper, and lid if desired. Specify Sta-Warm glue melters.

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Reed, Raphia, Handicraft Supplies
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MAKE BOWS AND ARROWS

M-1 FLAT BOW BOOK shows how..$1.05
M-1½ FUN WITH BOW & ARROW.... .31
M-2 LEATHER LACING GUIDE..... .31

Excellent shop and sports project.

Postpaid, fast, first class mail. Lots of pictures. 16 pp., 32nd anniversary catalog free.

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by Fisher and Crowley

Ten drawing projects of common electrical machines and controls, with answers
Price $2.75 less 20% — 6 or more copies 30%
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Box 227 Manchester, Conn.

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T. A. FOLEY LUMBER CO.
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Especially qualified to be of service to the school printshop.

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Forms returned same day received.

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INDEX TO ADVERTISERS, PRODUCTS AND SERVICES

Advertisers in this index are given a key number in addition to the page number on which the advertisement appears. Refer to the advertisement for product or services available. Write direct to advertiser or use the business reply card in requesting information from a number of advertisers.

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SHOP EQUIPMENT NEWS

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0404	UTICA DROP FORGE AND TOOL CORP. *Third Hand Nail Clip*	36A
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0406	BLACK & DECKER MFG. CO. *Compact Electric Workshop on Wall*	37A
0407	AIR REDUCTION SALES CO. *12-Page Booklet on Flame Cutting*	38A
0408	SURFACE COMBUSTION CORP. *Bulletin SC-165 on Vertical Type Muffle Furnace*	38A
0409	ALLIED RADIO CORP. *Free Booklet for Radio Classes and Clubs*	40A
0410	SOUTH BEND LATHE WORKS *New Lathe Training Films — Bulletin 5230*	40A
0411	GENERAL ELECTRIC CO. *Manual on Demand Meters*	40A
0412	FORD MOTOR CO. *1953 Industrial Arts Awards Winners*	40A

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P.O. Box No. 2068
MILWAUKEE 1, WISCONSIN

DESCRIPTIVE MATERIAL

(Continued from page 38A)

FREE BOOKLET FOR RADIO CLASSES AND CLUBS

The Allied Radio Corporation is distributing a free booklet to radio clubs, radio classes, electronics students, and hobbyists.

The booklet, "*You Can Be There,*" is a dramatic story of the romance of amateur radio and the thrills that come with the hobby of operating a "Ham" station.

The Federal Communications Commission (FCC), by means of a new "Novice" license, has made it easy for anyone to become eligible to operate a station, since only a small amount of technical skill and preparation is required.

Instructors of radio classes, officers and sponsors of clubs and other groups can obtain any number of these free booklets by writing to: Zole Csolkovits, W9TXZ, *Allied Radio Corporation, 833 W. Jackson Blvd., Chicago 7, Ill.*

(For Convenience Circle Index Code 0409)

NEW LATHE TRAINING FILMS

Motion pictures for training lathe operators is a new service offered by the South Bend Lathe Works. It is described in Bulletin 5230. Three 16mm. sound films in full color are supplied on free loan to industrial firms, educational institutions, and the armed forces. In addition to English dialog, sound tracks are available in French and Spanish.

The films make a series. First, *The Metalworking Lathe* introduces the lathe to the beginner. The second, *Plain Turning*, shows all operations necessary to machine a shaft. Film three, *Grinding Cutter Bits*, shows the correct way to grind tools for different lathe operations. Showing time for each film is approximately 20 minutes.

For complete details ask for Film Bulletin 5230. Address *South Bend Lathe Works, 425 East Madison St., South Bend 22, Ind.*

(For Convenience Circle Index Code 0410)

MANUAL ON DEMAND METERS

General Electric Company has just published a comprehensive booklet on demand metering, which describes in detail the theory, economics, operation, and application of demand meters. It provides an excellent summary of the principles and problems of demand metering; a reference for helping in specific demand-measuring application; and a clear, simple textbook for students and trainees.

For your copy, write to *General Electric Co., Schenectady 5, N. Y.*

(For Convenience Circle Index Code 0411)

1953 INDUSTRIAL ARTS AWARDS WINNERS

Ford Motor Company has issued a printed list of the names of the Industrial Arts Awards winners. The names are arranged by states.

In the listings, the name of the student winner is given first and the name of his instructor last.

The December, 1953, issue of *Shopcraft*, issued by the Ford Motor Company, shows pictures of the outstanding achievement award projects.

Accompanying the foregoing is a booklet, *The Ford Rotunda*, which shows pictures of the rotunda refurbished specially for the company's 50th anniversary.

(For Convenience Circle Index Code 0412)

Business and Personal News

APPOINTED DIRECTOR OF DESIGN

William DeHart has joined Towle Silversmiths as director of design. His broad experience is in the general field of designing, and more particularly as a designer and craftsman in sterling.

Mr. DeHart comes to Towle from his own shop in Albuquerque, N. Mex., where he designed and made sterling silver jewelry and silverware. He is a graduate from the University of New Mexico and received his master's degree in industrial design from the University of Iowa. For a period of six years he taught jewelry and silversmithing at the University of New Mexico.

In 1948 he was one of 12 teachers selected to attend the National Silversmithing Workshop Conference for teachers conducted by Handy and Harman, fabricators of precious metals, as part of the educational program of their Craft Service Department.

PERSONNEL CHANGES ANNOUNCED

Ditto, Incorporated, Chicago, Ill., manufacturer of liquid and gelatin duplicating machines and supplies, announces the following changes in its personnel setup.

L. A. Watkins, formerly General Sales Manager, was promoted to vice-president in charge of domestic sales.

C. E. Snow was elected vice-president of Ditto Press, Incorporated, the Company's large forms printing division in Cincinnati.

S. J. Burk was named vice-president of Ditto of Canada, Ltd., the Company's Canadian division. He started with Ditto of Canada in 1949 as comptroller, and was advanced to the position of general manager in 1952 when Mr. Watkins moved to Ditto's Chicago headquarters.

CLAUDE AND HAGER ON FARMERS' WEEK PROGRAM

John Claude, manager of school sales, Rockwell Manufacturing Company's Delta Power Tool Division, represented industry at the annual "Farmers' Week" held February 1-6 by Michigan State College at East Lansing, Mich. He spoke on "The Planning, Equipping, and Operation of Hobby and Home Workshops."

John Hager, vice-president of the Grand Rapids Varnish Corporation, conducted an afternoon program on wood finishing which tied in with Mr. Claude's address given in the morning.

WILLARD K. LASHER ELECTED PRESIDENT OF AMERICAN TECHNICAL SOCIETY

Willard K. Lasher, formerly vice-president, has been elected president of the American Technical Society, publishers of vocational texts, industrial cyclopedias, and home study courses.

In his new capacity, he not only heads the publishing division but also continues as sales director of the home study division.

Mr. Lasher joined the firm in 1922 and has developed job training texts and study guides for civilian and military training courses.

David N. McCarl was elected executive vice-president. He was formerly vice-president and director, vocational and wholesale divisions.

USE THESE CARDS

Encircle the key number of the advertisement in which you are interested. Where the advertisement states that a charge is made for a catalog or booklet, the amount indicated, cash, check or postage, must accompany your request if you encircle the key number to obtain the material offered, and should be sent directly to the advertiser.
Detach and mail card. No postage required.

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April, 1954

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41	415	422	429	436	442	448	454	460	466	472		
42	416	423	430	437	443	449	455	461	467	473		
43	417	424	431	438	444	450	456	462	468	474		
44	418	425	432	439	445	451	457	463	469	475		
45	419	426	433	440	446	452	458	464	470	476		
46	420	427	434									
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42	416	423	430	437	443	449	455	461	467	473		
43	417	424	431	438	444	450	456	462	468	474		
44	418	425	432	439	445	451	457	463	469	475		
45	419	426	433	440	446	452	458	464	470	476		
46	420	427	434									
NEWS OF PRODUCTS FOR THE SCHOOLS												
0401	0402	0403	0404	0405	0406	0407	0408	0409	0410	0411	0412	

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School _____

Address _____

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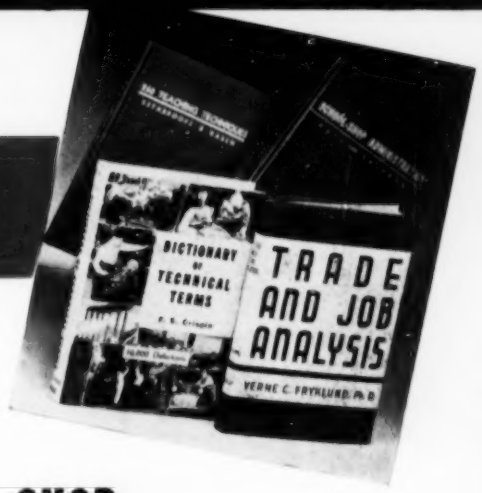
To Aid the School-Shop Teacher...

PROFESSIONAL BOOKS



Announcing...

A New Reference Work on—

THE SUPERVISION OF INDUSTRIAL ARTS

By WILLIAM A. BAKAMIS

This complete book on the supervision of industrial arts is designed to be used as reference "in-service" reading by teachers and supervisors and as a basal text for classes in school-shop supervision. It reflects sound concepts of education and a practical, especially modern approach to the difficulties of an effective supervisory program. To be ready in time for use during the coming summer-school session. In preparation

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By ARTHUR B. MAYS and CARL H. CASBURG

A comprehensive overview of the administrative side of the school-shop, newly revised to feature up-to-date advice on typical modern shop problems. $2.50

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(Revised and Enlarged)
By VERNE C. FRYKLUND

How to organize and teach technical subjects and industrials skills in the most efficient manner is the subject of this competent and scientific guide to all teachers of industrial arts. $2.00

TEACHING WITH FILMS

By GEORGE H. FERN and ELDON B. ROBBINS

Here is all the practical information relative to the effective use of instructional films (including film strips) with special application to the field of industrial arts. $2.25

250 TEACHING TECHNIQUES

By EDWARD C. ESTABROOKE and R. RANDOLPH KARCH

Practical discussion of the elements of good instruction: the qualities of a good instructor, the conducting of shop activities, the planning and presenting of a lesson, etc. $1.75

LEADERS IN INDUSTRIAL EDUCATION

By WILLIAM T. BAWDEN

Short biographies of nine prominent men in the industrial education field: Calvin Woodward, Charles Richards, Ira Griffith, John Runkle, William Roberts, James Stout, etc. $3.00

HOW TO READ STATISTICS

By R. L. C. BUTSCH

A non-technical coverage of how to understand and interpret statistics for anyone who works with educational studies or the like. $2.50

DICTIONARY OF TECHNICAL TERMS

By FREDERIC S. CRISPIN

Newly revised to include television terms, this handy book contains classifications and terms used in the most widely practiced trades and crafts, and in related arts and sciences. $4.75

EXAMINATION COPIES SENT WITHOUT OBLIGATION FOR 30-DAY'S STUDY!

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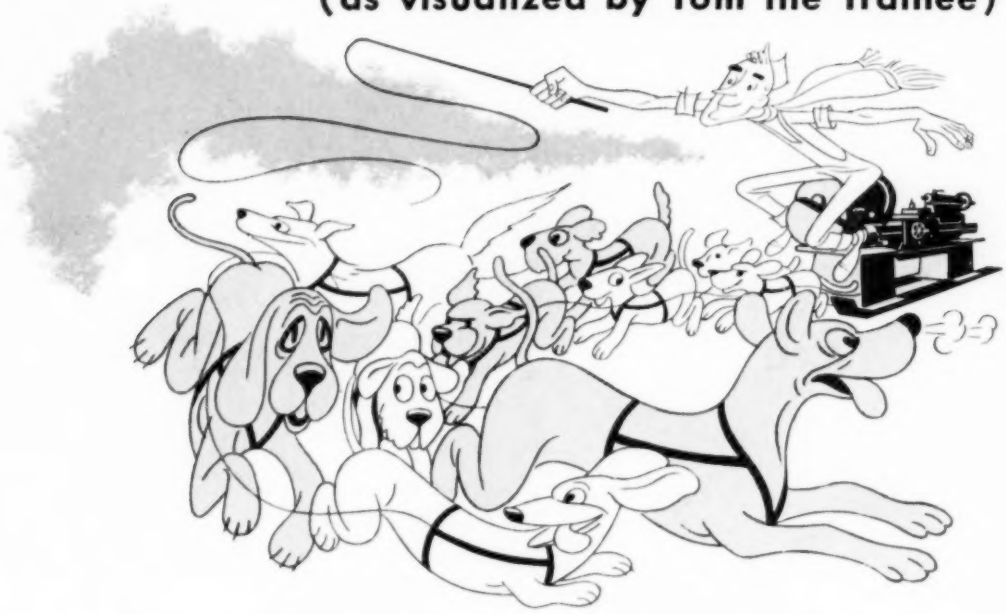
Turning Terminology

(as visualized by Tom the Trainee)



"DRIVING WITH DOGS"

You won't have to "hound" Tom, when he's Driving With Dogs on a LeBlond Regal. He'll learn like lightning on these low-cost lathes with the big-lathe features. They're specially designed as training lathes, help speed and simplify teaching methods, make high maintenance costs a thing of the past. Having LeBlond Regals in your training shop is like having a staff of well-trained assistants—always on the job, always helping you give Tom a thorough background for his future job in industry.

Check these big-lathe features:

Geared headstock—Power is transmitted efficiently at eight conveniently selected speeds.

Quick-change box—56 feeds and threads can be chosen simply through this foolproof mechanism.

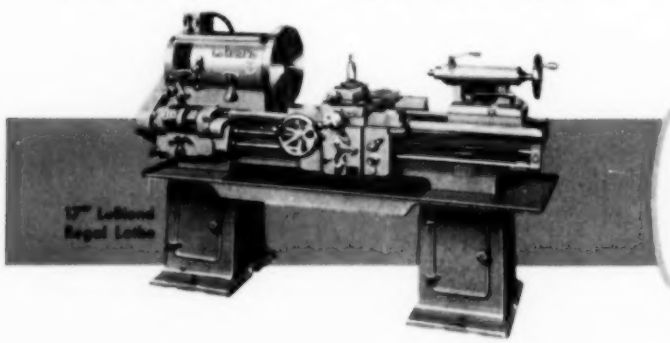
Leadscrew and feed rod—Both are provided to give you accurate thread-chasing, dependable feeds. Feed rod has safety clutch to automatically disengage feed when overloaded. Feed automatically engages when load is eliminated.

American Standard taper spindle nose—For safe, rugged, accurate positioning of chucks and faceplates.

One-piece apron—Long-life sturdiness and protection from dirt are built into the double-wall apron.

LeBlond Regal Lathes are available in 13″, 15″, 17″, 19″, 21″ and 24″ sizes and in a 13″ bench model. Also plain and sliding bed gap models. Write today for the complete story on these ideal training lathes.

THE R. K. LeBLOND MACHINE TOOL CO.
CINCINNATI 8, OHIO



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